ABILITY AND EDUCATIONAL OPPORTUNITY

Papers by

J. Ferrez, J. Floud, T. Husén, K. Härnqvist,
J. Vaizey, P. de Wolff, D. Wolfle

Editor and Rapporteur General

A. H. Halsey

ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

ABILITY AND EDUCATIONAL OPPORTUNITY

Economic enrichment and social progress have become world wide aspirations and the touchstone of modernity for all nations, developed or underdeveloped. Out of the discussion of means to these desired ends has come a new conception of education as the principal vehicle of social and economic advance. Governments and scholars are accordingly concerned to discover efficient means of educational development. This book is designed as a contribution to that problem.

It is focussed on the Member countries of O.E.E.C. and comprises an analysis of the major obstacles to the use of [illegible]ntial human abilities in education. [illegible] arriers associated with social class, [illegible]y, school organisation and cultural [illegible]alities are discussed by Jean Floud [illegible].K.), Jean Ferrez (France), Torsten Husén (Sweden) and Dael Wolfle (U.S.A.), and the problems of measuring reserves of talent and the use of international statistics are presented by Pieter de Wolff (Netherlands), Kjell Härnqvist (Sweden) and John Vaizey (U.K.).

A.H. Halsey reviews the problem, as it was defined by a forum of international experts convened by O.E.E.C. Held at Kungälv in June 1961, and chaired by Lionel Elvin, the Conference was attended by delegates from the United States and many Western European countries.

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Report on the Conference organised by the Office
for Scientific and Technical Personnel,
in collaboration with the Swedish Ministry
of Education, in Kungälv, Sweden,
11th -16th June 1961.

ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

The Organisation for Economic Co-operation and Development was set up under a Convention signed in Paris on 14th December 1960 by the Member countries of the Organisation for European Economic Co-operation and by Canada and the United States. This Convention provides that the O.E.C.D. shall promote policies designed:

- *to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;*
- *to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development;*
- *to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.*

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The legal personality possessed by the Organisation for European Economic Co-operation continues in the O.E.C.D., which came into being on 30th September 1961.

The Members of O.E.C.D. are: Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

The Directorate for Scientific Affairs, which is responsible for the publication of the present report, has been established within O.E.C.D. to take charge of the activities of the Organisation relating to scientific research and to the expansion and rational utilisation of the scientific and technical personnel available so as to meet the needs arising from economic growth.

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PREFACE

STATE INSTITUTE OF EDUCATION ★ BANIPUR ★

PREFACE

There is pressure in all European countries today to expand public education. This is demanded in part as a human right, in part as necessary for economic and social progress. But doubts have been expressed as to the wisdom of too rapid and too large an expansion. Will not the quality of our secondary and higher education suffer? No doubt access to secondary and higher education should be made less dependent on financial and social position, but do we have large reserves of ability in our populations which have been denied their opportunity through education? These are questions on which many people have opinions but about which there has been comparatively little discussion based on research. The Conference of which this volume is the official Report was called by the Organisation for European Economic Co-operation in the hope that discussion of this important subject could be put on a sounder basis.

I had the honour of presiding over the Conference and in my opening remarks I observed that I doubted whether we would come to conclusions that could be drafted in some sort of a declaration to the world, in the style that international conferences sometimes rashly attempt; but that I hoped our thinking would gradually take a felt direction which could be communicated to interested people. It was in line with this conception that we commissioned our "Rapporteur", Dr. Halsey, not to summarise our discussions session by session, but rather to give his personal account of the successive themes we took up and of the treatment of them. On the last day of the Conference Dr. Halsey explained what he had in mind to write and listened to comments and suggested amendments. The result, in the pages that follow, is neither a statement of his own views nor a mere précis of our debates, but something between the two: a personal formulation of the "sense of the meeting". As such I am sure it is more interesting than any more routine statement would be.

Fortunately the Conference was small enough to avoid the temptations of public oratory. It was a little too large for mere conversation, but the tone was near to that of deliberate conversation. Members were free to intervene more than once in discussion of a given topic. The tone was of course largely influenced by the series of careful and scholarly papers that had been circulated in advance and which were introduced and supplemented in turn by their authors. To the authors the Conference was greatly indebted. The papers are reproduced in full in this volume and together with Dr. Halsey's Report will give the reader a very good conspectus of the Conference's work.

Nearly all the O.E.E.C. countries were represented at the Conference. Among the delegates were educational administrators, educational research workers and school and university teachers. I think we felt that we were under two obligations: to be scholarly, and at the same time to realise that we were deliberating within the realistic conditions of public policy. Whether the Conference succeeded in this feat of balance the reader must judge.

It would, I think, not be going too far to say that most of the members felt that we were living in a historic period of European educational development, one in which changes were inevitable but equally one in which changes could be influenced by wise or unwise counsel. Until the second half of the eighteenth century in Europe the kind of question about education and opportunity that we had been called together to discuss would have made little sense. It was then that Europe, stimulated by the attitudes of Americans like Franklin and Jefferson as well as moved by deep currents of feeling in France and then in other European countries, had its first vision of new possibilities in Man that were to be realised above all through universal education. Against the hard facts of the social history of the following century this utopian dream appeared to fade; but at the same time the increasing industrialisation of Western Europe brought about a first, if somewhat equivocal, marriage between the economists and the educationists of which we hope the present growing belief in education as a social investment is a more honest and enlightened example. The movement for popular education did grow steadily through the nineteenth century but there were brakes upon its progress. In the first place it was widely held to be wrong, socially and even morally wrong, to concede so much to educational opportunity as to threaten the existing social order. Opportunity for the exceptional lad from the working classes, yes; but general education for the sons of the labouring poor beyond what social utility demanded was another matter (and as for serious educational opportunity for girls and women—certainly not!). Secondly, a widespread system of public education costs a great deal of money; and although considerations of national interest in education helped the movement in some countries, yet the widespread philosophy of "laisser-faire" and of a State that refrained from too many expensive positive functions militated against the establishment of comprehensive systems of more than rudimentary public education.

In both these matters we have witnessed something like a revolution in our time. A supposed threat to a social order is not now admitted as a respectable argument against satisfying the right to education, and even Ministers of Finance now tend to look on education not simply as consumption but as an indispensable concomitant of an expanding economy. Rights, however, are still contingent however much they may sometimes be felt to be absolute. The right to education must in practice be contingent, partly on the ability of the economy to sustain it, and partly on the capacity of the individual to profit from it. It was the second of these questions that the Kungälv Conference met to discuss, conscious that now the Ministers of Finance were apparently being converted to the wisdom of educational expenditure it might be the educationists themselves who were the last conservatives—and rightly so, unless the human material really is there in sufficient quantity. What was the reasonable view, on such evidence as could be adduced, of the reserves of not fully utilised educable capacity?

From the start the Conference was aware that although it attempted a scholarly approach to this question it was indeed in the realm of public action, for we opened with addresses from two Ministers of Education. We listened to the Minister of Education for Yugoslavia and were greatly interested in the account he gave of the struggle to extend education in a country which, by general European standards, has had a low income per capita. And it was very appropriate that the Conference should also be addressed by the Minister of Education for Sweden, our host country, for in Sweden at the present time there is a far-reaching educational reform in progress and the most careful evaluation taking place as to the effects of different kinds of school organisation on the realisation of ability.

It only remains for me to say, as a conference chairman who had no duties until the sessions began, that the pleasurableness as well as the outcomes of the Conference owed everything to our Swedish hosts (I should particularly wish to mention Mr. Löwbeer, the Chairman of the Steering Committee) and to the hard and careful preparation made by the Secretariat, who according to convention may remain nameless but most certainly not unthanked.

Lionel ELVIN.

CHAPTER 1

A REVIEW OF THE CONFERENCE

A. H. HALSEY

CHAPTER 1

A REVIEW OF THE CONFERENCE

A. H. HALSEY

Prefatory Note

The review which follows, though it attempts to do summary justice to the many contributions made to the Conference, is a personal report for which the author is alone responsible. Since it embodies the views of experts and informed laymen from sixteen O.E.E.C. countries, the report, in a direct and obvious sense, is representative of current European and North American knowledge and opinion on the subject of ability and opportunity in education. Yet the reader must be warned against what may be a misleading appearance of representativeness. The selection of unrepresentative representatives to attend international conferences is scarcely avoidable. Representatives will differ from their countrymen at least in being especially concerned with or unusually qualified to discuss the questions at issue. In this case the delegates may be assumed to be among those in each country who are most aware of the facts and implications of economic development and who are familiar with, and in many cases highly sympathetic towards, the most progressive trends in European educational opinion.

Education is now recognised as one of the principal forces behind economic growth. It is therefore both characteristic and appropriate that the O.E.E.C., as an innovating and facilitating organisation of contemporary economic thought, should have brought together a conference on ability and opportunity in the educational systems of its Member and associated countries. The mobilisation of talent is essential to economic development. But to raise this issue is to go beyond the frontiers of conventionally defined economic discussion into the territory of the sociologist and psychologist and ultimately to the rarified regions of ethics.

The problem was posed in terms of a metaphorical "pool of ability", to be tapped on behalf of the ideal of human self-expression and harnessed to the needs of a developing society for scientific manpower. Delegates were there from countries at widely different levels of economic development seeking answers which could be translated into practical policy. Experts were there, and had submitted the papers reproduced below as Chapters 2—6, in pursuit of scientific understanding of a many-sided problem in the social sciences. The resultant balance of scholar and policy-maker encouraged a constructive "middle-level" in the generality of the discussion, avoiding both unreal abstraction and trivial technicalities.

At the risk of imposing arbitrary compartments on an integrated series of discussions I can arrange my impressions of the Conference into four main divisions. First, it seemed to me, there was a striking unanimity as to the common ideals towards which social policy should be directed—an ethical convergence which overlay, and helped to put into context, the diversity of cultural and economic conditions under which different countries seek educational progress. No less remarkable, however, was a parallel clarification of the general nature of the issues—a cognitive convergence on the analysis of the relation between potential and actual in human ability against the background of economic development. But the main focus of discussion was on social and educational impediments to the development of human talents and consisted of extension, illustration, qualification and supplement to the papers presented below as Chapters 3, 4 and 5. These will occupy me in the third section of this chapter; and finally I will try to draw out some problems and conclusions for the consideration of each Member country in the light of its own special conditions.

Section 1. Moral Convergence

The Major Theme

The claim of individuals to be afforded opportunity for the attainment of their full human stature has become, in the Western world, a moral right universally conceded. Moreover, in the second half of the twentieth century, education is seen as the principal means of self-development. In his opening address, Mr. Edenman, the Swedish Minister of Education, asserted: "If we are really bent on fostering individual ability . . ., we must first organise the compulsory school in such a way as will give everyone the same right and opportunity to an education regardless of socio-economic background and geographical location". And the Yugoslav Minister of Education, Mr. Crvenkovski, told the Conference that "in Yugoslavia all obstacles of a social nature preventing individuals from attaining success in any respect and in any field, including the attainment of highest education, have been abolished".

This great moral affirmation of individualism was repeatedly advanced by delegate after delegate until one wondered how, with such a consensus of opinion, there could be so much actual variation of educational opportunity from one country to another. Part of the explanation is to be found in considering the nature of individual rights. Mr. Elvin, the Chairman of the Conference, referring to the 26th Article of the Declaration of Human Rights, emphasised the contingent quality of the right to education. One contingency is the availability of educational resources: and the variation here is such that underprivilege in one country would be richness of opportunity in another. International variations in educational opportunity are partially reflective of disparities in national income per head. But a second contingency is that the right to education is set against the capacity of the individual to profit by it and this again leaves room for much variation, at any given level of national resources, in the assessment of what amount and what kind of educational provision is appropriate. Underlying such assessments are national differences in the value put upon education.

Minimally then, the consensus comes to a universal acceptance of the principle of formal equality of educational opportunity. This revolution in European thought of the late nineteenth and twentieth centuries is now an established starting point for the evaluation of modern educational systems. At the same time, however, many contributions made it clear that opinion in many quarters has moved beyond the minimal starting point. Ability to profit from education is itself increasingly seen to be a result of social experience. As psychological and sociological study shows the influence of social factors on measured intelligence and on educational attainment, so the moral conclusion is drawn that equality of opportunity must be redefined in a stronger sense to include also the opportunity to overcome such obstacles to the development of one's ability. The radical implications for social and educational policy that go with such a conception again presented each delegate with a touchstone, if a complex one, for evaluation of the educational arrangements in his own country. The importance of this notion of going beyond a formal equality of opportunity would be difficult to exaggerate. Thus one could not say that *all* social barriers to educational opportunity have been abolished in Yugoslavia. All formal social barriers have certainly been swept away; but as was clear from the moving story of immense educational effort told by Mr. Crvenkovski, there are formidable difficulties of scientific understanding and policy formation to be overcome before a truly substantive equality of opportunity becomes a reality either in Yugoslavia or any other country in the world.

The continuity of the emerging educational revolution with past efforts to do away with poverty did not pass without notice. The second half of the nineteenth century saw a change in the moral outlook of many European countries concerning the age-old problem of material poverty. Traditionally, when poverty lay beyond the means of man to ameliorate, the efforts of religious organisation and social policy were directed towards its consolation. But when economic advance brought the possibility of the abolition of poverty, it was gradually redefined as a moral evil to be eliminated by enlightened social action. To-day, with the further advance of economic means and the gradual development of knowledge about the determinants of the educability of the individual, education is coming to occupy a position, as the object of social policy, which is analagous to that once held by material poverty.

The Minor Theme

As a corollary of the principle of individual right it may be stated that the individual has the right to self-expression through training for an occupation which will call for the exercise of his full capacities as a member of the productive organisation of society. From this corollary the inference for social policy may be drawn that it is the duty of the state to mobilise into its economy the full potential of its human resources. In this way the development of trained manpower is thought of as an obligation on governments.

On this theme, derivative as it is from the major consensus, there were many disagreements and reservations. Several speakers referred apprehensively to the possibility of a new academic proletariat—a problem of considerable proportions in the inter-war period on the continent of Europe and one which, paradoxically, hinders economic development in some countries (e.g. India) to-day. The problem of educational over-production is touched on by Professors de Wolff and Härnqvist in Chapter 6 and was mentioned by the Swedish Minister of Education, Mr. Edenman, in relation to university degrees in humanistic studies.[1] Similarly in a later discussion of the supply of engineers, Father Macnamara (Ireland) mentioned the psychological cost to individuals and the social cost in loss of leadership among the lower social strata which is involved in increasing the rate of upward social mobility through education. Mr. McIntosh (United Kingdom) referred to a parallel example from the mining areas of Scotland and Professor Meili (Switzerland) mentioned the resistance of rural teachers to the migration of talent from countryside to town in his country.

However, despite some diverse undercurrents of reservation and disagreement, there was a majority opinion that, under present conditions for most countries, there is no essential conflict between the major and the minor ethical aims to which I have referred. The impulse of states towards the development of scientific manpower does not run counter to the demand of individuals for opportunities to develop a full human stature. Yet no delegate could have gone away with the comfortable assurance that this is an immutable relation. On the contrary, because of the very aim towards economic efficiency and betterment which O.E.E.C. countries pursue, it is realistic to anticipate a future society in which the two themes would clash. In the more affluent societies, especially the U.S.A., there are already signs of a conflict between the idea of education for investment and education as consumption: affluence eventually sharpens the distinction between man as a producer and man as a citizen.[1]

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[1] "In most technical fields we shall have to reckon with a severe shortage of manpower for a long time to come. At the same time, with needs measured by present-day yardsticks, Sweden will gradually be accumulating a labour surplus in other fields, especially in those which draw on persons with a humanistic education. In this situation, public opinion will not rest content with a declaration that every increment is welcome—although one's imagination staggers at the thought of how we are going to use all the linguists, psychologists, sociologists and other humanists that our universities will be turning out". (From Mr. Edenman's Opening Address to the Conference.)

Ultimately we must be prepared to recognise that an educational system which was closely and completely geared to supplying manpower for the productive organisation of society would, at the same time, be an agency of dehumanisation. The use of education primarily as a sieve of talent for the economy was presented by several speakers to the Conference as repulsively "meritocratic" in its general social and psychological implications; and at points falling very far short of the ultimate meritocracy of Michael Young's fable,[2] many delegates would begin to weigh the returns of increased economic efficiency against the costs of familial and other primary-group loyalties and solidarities. Moreover, as Professor Dahrendorf (Germany) insisted, the major theme of individual right implies that, beyond acquiring the necessary moral and cognitive equipment to enable him to live in a complex society, a man or woman has the right *not* to be educated and certainly the right not to be trained for a job or career according to the passing requirements of the national economy. The arrangements of society for the production of skill and wealth must, in the last analysis, take their place as means to the end of an enriched life for the individual citizen.

Section 2. COGNITIVE CONVERGENCE

The Assumption of Economic Development

The changing moral conception of education in the twentieth century has been facilitated by the advance of knowledge in the social sciences and the spread of a common view and even a common language concerning such matters as the relation between education and social structure. In general those who attended the Conference showed little disposition to dispute the probable future trends of Western society.

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[1] It must, of course, be understood that the education of a citizen in modern society is education for an increasingly scientific culture. The manpower needs of society require the development of scientific and technical education but such education is also in itself part of the wide cultivation of the member of an advanced industrial country.

[2] *The Rise of the Meritocracy*, London, Thames & Hudson, 1958.

First may be remarked the acceptance by everyone of the assumption of continuing, inescapable social change as the prospect for all countries, developed or underdeveloped. The direction of change is seen as towards what may be called the technological society[1]—a society in which human material welfare is continuously increased by the application of science to the productive process—a society, therefore, which places education in a central institutional position as both a source of technological and cultural change and as a vast training apparatus for the highly diversified manpower requirements of a technological economy.

One noticeable implication of this assumption is that the search for educable talent tends to be defined as a search for creative or innovating ability—an attempt to identify the individual who can make creative rather than conservative contributions to the intellectual life of his country. The assumption tends to be that the primary task of education is to release the energies of those who will disturb the existing social structure whereas the traditional functions of education, as is reflected in the classical curriculum and the content of conventional selective devices,[2] has been to give an adaptive schooling to those who must fit into a social structure conceived of as more or less immutable. There is a fundamental problem here to which the Conference did, perhaps, less than justice. Economic growth, while using education to produce new people with new skills, at the same time leads to a more diversified and more mobile society in which the educational system has also to carry novel burdens of maintenance and dissemination of common values which were previously preserved in familial and local social organisations. Precisely because it is the major agent of social change, education has also to promote consensus in modern society.

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[1] Cf. Jean Floud and A. H. Halsey "The Sociology of Education", A Trend Report and Bibliography, *Current Sociology*, Vol. VIII, No. 3, 1958, and A. H. Halsey, Jean Floud and C. Arnold Anderson (eds.) *Education, Economy and Society*, N. Y. Free Press, 1961, Chapter 1.

[2] Cf. the work of J. W. Getzels and P. W. Jackson, especially their "Occupational Choice and Cognitive Functioning: career aspirations of highly intelligent and of highly creative adolescents", *Journal of Abnormal and Social Psychology*, 1960, Vol. 61, No. 1, pp. 119–123.

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That education has a special role to play in economic growth was an article of faith among the delegates. Dr. Wolfle was among those who laid stress on the high economic return which accrues to investment in educable talent. He referred to the work of Professor Theodore Schultz at the University of Chicago,[1] in which an assessment of the return to education as investment has been made for the U.S.A. over a period of 60 years. Professor Schultz computes the size of investment in two parts. One part includes the cost of teachers' salaries, building construction and maintenance, textbooks, libraries, laboratories and all other cash outlays necessary to develop and maintain an educational system: the other part consists of the foregone earnings of students. Calculations on this basis lead to the conclusion that, over a period in which the American educational system has experienced an enormous expansion and democratisation of access, a national return of nine to fourteen per cent has been derived from the money invested.[2]

Shared views on the role of education in determining the trajectory of each country towards the technological society were accompanied by an unusually subtle appreciation of the complexities of the relation between education and social structure. Familiar simplifications were avoided. Schools were conceived of neither as isolated from, nor dependent upon, the societies in which they operate, nor as engines, ready to hand, for the purposes of social change. At point after point in the discussion we were reminded of the complicated interplay which exists between school and society; a dialectic or alchemy of interaction. Thus, to take a single example, Mrs. Liefmann-Keil (Germany) and Mr. Vaizey referred to the fact that educational expansion leads to a reduction of traditional income differentials. The ensuing discussion made it clear that just as educational opportunity influences the distribution of income so does the latter react to alter the social distribution of demand for education and indirectly the content of education: and so, through a complex interaction, educational policy is brought into the total process of allocating "life-chances" between individual members of society.

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[1] Cf. T. W. Schultz "Capital Formation by Education", *Journal of Political Economy*, Vol. LXVIII, No. 6, December 1960.

[2] This rate of return has accrued under particular historical and social conditions determining the size and effectiveness of the factors of production, the state of knowledge, etc.—i.e. conditions which will vary from one country or period to another. Nevertheless as Wolfle pointed out, Brazil, an underdeveloped country with an inadequate educational system, has recently made similar calculations and used the same type of argument to increase its educational budget.

This more sophisticated sociology of education clarified the existence of two challenges to the Conference. For the national delegates there is the challenge of applying general knowledge concerning obstacles to the release of human ability through educational opportunity. Every country can see education as a means towards a richer and more just life for its members but every country has its own special history of education and its own constellation of social forces making up a unique set of conditions in terms of which, social and educational policy has to be formulated. For the social scientists who attended the Conference there is the challenge to produce a better general theory of the relation between education and social structure, under conditions of developing industrialism, than has hitherto been available. The notions of technological society and the centrality of the educational process need to be worked out not only in relation to such economic considerations as the return to investment, but also in terms of the social determinants of educability, the sociology of the school, the professionalisation of new sectors of the labour force and the problems of cohesion and consensus in a differentiated society.

The Nature of the Reserves of Ability

However, the most striking single agreement that was arrived at in discussion was the ready abandonment of the metaphor of the "pool of ability" as scientifically misleading and, from the point of view of policy, irrelevant. Instead the discussion, ably and firmly guided by Dr. Wolfle and Mr. Elvin in their introductory remarks, moved towards more elaborate social and psychological conceptions of complex processes through which potential qualities are transformed into recognised and educated performances of many different kinds.

The metaphor of a pool suggests the idea of genetic qualities in a population which set limits to the amount of human energy and intelligence that could be liberated by a programme of education. That such limits exist was not disputed by any participant, though its scientific status is no more than that of a plausible hypothesis. But the Conference resolutely, and I think wisely, averted its eyes from the problem of genetic limits[1] for two sufficient reasons: the absence of definite scientific knowledge and the demonstrable fact that, even in the most advanced educational systems among O.E.E.C. countries, the social and educational limitations on the mobilisation of talent are such as to occupy the full attention of social and educational policy makers within the foreseeable future. No human culture is yet baulked in its development by the limits of human genetic capacity. It is not that the notion of limits as such is irrelevant to our problem: but, for the present, the limits with which we have to deal are economic, environmental and educational. They are accordingly, as Professor de Wolff insisted, most usefully defined in short-run operational terms.

The phrase "pool of ability" is also misleading in its use of the word ability in the singular. Discussion yielded a conception of ability, not as a unitary capacity, but as a whole range of human skills and excellencies, literate, numerate and manual. Thus refinement or differentiation of the measures used, a widening of the curriculum of school or, indeed, any change in the demands that a society puts on its members will reveal new abilities among them. Not one ability but many abilities are to be sought in a programme designed to mobilise talent.

Going further in this direction it became clear that intelligence and other human capacities have to be seen less as the property of individuals and more as social or cultural products. It is not only that different societies, according to their values and their culture, will recognise and reward different kinds of abilities but, what is of crucial significance in the present context, *a process of economic and social development is a process of creating ability*. Thus investment in education as a means to satisfy the manpower requirements of economic growth is not a simple oneway process. Increased resources make it possible to mobilise new reserves of talent. And so it was that the Conference was led to the conclusion that the higher the national income per head enjoyed by a country, the greater the amount of human ability which can in practice be made available for mobilisation.

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[1] M. Reuchlin (France) raised the question of the possibility that assortative mating might produce genetic differences between social classes and thus limit the educability of the lower strata. This point, which was taken up by Mrs. Floud at a later point in the discussions, is dealt with below, p. 33.

In a narrower sense, and in the short run, ability may be looked upon as an educational artifact, varying according to the structure of courses, curriculum and teaching methods. The narrowness of traditional European school curricula, especially in secondary schools of the gymnasium type, came in for sharp criticism from Professor Langeveld (Netherlands) and others. The point here is that a broadening of these curricula and, in some countries, a greater recognition of the value of scientifically and technically oriented abilities,[1] would lay bare new reserves of talent previously hidden by educational definition.

In this connection the Conference was also reminded that, in modern society, abilities are more and more defined through formal educational processes. Before the rise of national systems of elementary education in the nineteenth century and the further elaboration of secondary and higher education in close functional relation to modern economies, there were many non-educational avenues for the expression of talent, for example through success in business, politics or trade union activity. Moreover, as Mr. Friis (Denmark) insisted, in present day underdeveloped countries much, perhaps most, ability continues to live outside the system of formal schooling.[2] In other words the modern emphasis on educated manpower and the search for talent through education is at the same time a process of eliminating other avenues to the demonstration and exercise of ability. The policy conclusion is therefore suggested that, as economic and educational expansion proceed, the need for educational flexibility in the definition of talent becomes greater and greater.

In summary, I have tried to show in this and the preceding section, that the discussions, in which nearly all the delegates participated, resulted in a remarkable degree of clarification of the conceptual and moral issues which are involved in efforts to release talent in the service of economic development and the enrichment of the life of the individual in modern society.

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[1] A point stressed by Mr. McIntosh (United Kingdom).

[2] In making this point Mr. Friis was concerned to stress the importance of adult education as a mode of quick identification of talent previously unrecognised through lack of educational opportunity.

Section 3. OBSTACLES TO THE DEVELOPMENT OF ABILITY

After the presentation of the evidence no one can have left the Conference in any doubt as to the magnitude of the barriers in the way of the expression of human capacities. Even the most affluent and educationally lavish countries remain but wasteful engines of the energies of their citizens. True, as Mr. Vaizey shows in Chapter 7, comparative statistics are prone to misinterpretation and only the broadest comparisons may be relied upon.[1] Nevertheless the evidence of variations within and between countries permits no other interpretation than that of wholesale wastage of potential abilities. "If one nation can bring an eighth or a quarter, or a half of its youth to the satisfactory completion of the general secondary level of education, another nation cannot claim that only three or four or six per cent of its youth is intellectually qualified for that level of educational attainment. Or, if one nation can bring eight or ten or twelve per cent of its youth into the university, another nation cannot claim that only two, or three, or four per cent are intellectually qualified for university entrance".[2] Educational expansion leaves no country untouched. Figures for Spain presented by Señor Utande, showing an expansion of the university student population from 54,600 to 78,000 in the decade of the 1950s could be paralleled all over Europe. Thus the number of Swedish undergraduates will be doubled in the next 10 years. Yet the statistics and the examples quoted by participants demonstrate the continuance of barriers and inequalities of opportunity in all countries. While Belgium has one in four of its 18 year old boys in school, Great Britain has only one in eight. In France, M. Reuchlin reported, a third to a half of those who do not apply for secondary education have the intellectual ability to do so. From Turkey, Mr. Özdil similarly reported widespread failure of the population to take advantage of existing educational opportunities.

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[1] A useful summary "Index of full-time education of the 5–19 year age groups" was presented by Mr. Vaizey.
It gives the following broad groupings:
100 = Canada, U.S.A.
90 = Iceland
70–80 = Belgium, France, Netherlands, Norway, Sweden, U.K.
60–70 = Austria, Denmark, Germany, Greece, Ireland, Italy, Luxembourg, Switzerland.

[2] From the introductory remarks of Dr. Wolfle.

Identification and Measurement

The problem of identifying and measuring reserves of ability brings us back to the general point that human excellence is a social product as well as an individual quality. In a recent discussion of this question Professor R. K. Merton pointed out[1] that the word recognition, in English, has two meanings. There is recognition in the sense of reward which implies that identification of talent is a function of the needs and values of a particular society at a particular time; and there is recognition in the sense of discovery which is a function of the method of measurement used in the search for talent.

In discussing the admirably clear exposition of methods of measurement presented by Professors de Wolff and Härnqvist,[2] approaches were made from both of these points of view. Mr. Gass argued that since school marks are a cultural product, their use in identifying and quantifying reserves of ability meant that recognition and estimates are a function of the current values of the society in which measurement takes place. Professor Husén took this argument further and insisted that all of the four main methods of assessing ability, school marks, attainment tests, intelligence tests, and teachers' estimates, contained elements of social evaluation of one sort or another. School-marks[3] and attainment tests are affected by the pupils motivation, intelligence tests are not "culture-free" and teachers are not immune from selective perception. For this basic reason and the further reason that social values, educational curricula and methods, popular motivations, etc., are all subject to change, Professors de Wolff and Härnqvist emphasised the relatively short-run[4] character of estimates of reserves of ability, as well as their tentative nature in that they normally assume constant conditions of education and social structure.

However, for all their limitations, these methods put most useful tools into the hands of policy-makers. In particular the distinction between transition and completion probabilities (the latter being typically higher than the former in educational systems selecting for stage or type of schooling) is a valuable aid in identifying the locus, and assessing the relative importance, of rigidities and barriers in an educational system.

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[1] Cf. Adam Yarmolinsky *The Recognition of Excellence*, N.Y., Free Press, 1960, p. 297.

[2] Below, Chapter 6 and Appendix.

[3] M. Derivière (Belgium) and M. Reuchlin (France) drew attention to the bias which is introduced by the use of unstandardised school marks in assessing both the size and the distribution of potential ability.

[4] Professor de Wolff also observed that the long run in educational estimates is longer than the long run in economics.

A difficulty in the way of widespread use of these two kinds of probabilities is that the original Swedish research took several years to complete. However, by the method of simultaneous age groups,[1] this time may be reduced to one year. On this method a question was raised by Mr. Spitz (Netherlands) as to what prediction variable could be used at the beginning and end of the year of observation. The correlation between tests at the beginning and end of the year must be of the order of 0.90 if the relation between the predictor and educational success is to be reliable. The only predictor satisfying these requirements would be an intelligence test and even here age variations will tend to make results less reliable than is desirable. Nevertheless the feasibility of a reasonable estimate of reserves is beyond question, as is an assessment of the relative heights of different barriers to educational opportunity. The recommendation made by de Wolff and Härnqvist, that the many countries which have not yet attempted surveys of the size and distribution of their reserves of ability should do so, must therefore be underlined.

Interrelation of Education and Social Structure

The papers presented by M. Ferrez, Mrs. Floud and Professor Husén[2] were intended to show how social factors impinge on the long-run ideal, to which social policy should be directed, of establishing a perfect relationship in education between ability, opportunity and achievement. The discussion must have heightened the awareness of all participants to the inter-relatedness of the factors involved. Indeed Mrs. Floud made it explicit, in introducing her paper, that in choosing to write about social class she was seizing on one of a number of possibilities including sex, geographical location, ethnic affiliation or religion, though one which, in advanced industrial society, tends to overlay the other factors. Discussion might begin with geographical inequalities or with social class factors or with imperfections in the structure of education itself as intrusions on the ideal relationship of ability to opportunity and performance: but whatever the starting point, further analysis would end with a complex pattern of interaction between social and educational forces. Moreover the higher the stage of economic development, the more subtle does this interplay become. As Mrs. Floud points out,[1] the influence of social class in England up to World War II was conceived of primarily as a problem of securing access to traditionally middle-class schools for working class children of equal ability and the solutions lay in the removal of the obvious handicaps associated with poverty. But in the post-war period, rising standards of life and the continuing democratisation of secondary and higher education have brought up the question of social class as *a factor not simply in the distribution of educational opportunity but as a determinant of educational performance*. Consequently both analysis and policy formation must face the need to understand and deal with much more than the crude material forces which formerly overshadowed all others in preventing the release of ability through education.

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[1] Below, Chapter 6, Appendix p. 164.

[2] Below, Chapters 3, 4 and 5.

The Concept of Social Distance

Faced with this challenging problem of analysis, it was not surprising that the Conference cast about for integrating or unifying ideas which would serve to order the voluminous data collected by research from many different countries. In this connection the concept of social distance suggested by Professor Dahrendorf (Germany) was especially valuable. Education may be seen as fundamentally a process of transmitting culture over the barriers which separate the generations: a process of transmission from the cultivated adult to the unformed or partially formed child. But under modern conditions of accumulating knowledge and expanding systems of education, the school is called upon to disseminate an increasingly complex culture to new strata of the population. The modern educational problem, therefore, consists in the establishment of new kinds of communication over unfamiliar social distances. These social or cultural distances, in traditional analysis, have been expressed in terms of poverty, inadequate educational resources and other barriers of a material kind. But the notion of social distance may be extended to apply to the distances created by parochial mentality, limited class horizons, poor motivation, non-educational aims and so on, in such a way as to permit the translation of educational difficulties into social policy and the reverse, social policy into pedagogical technique. Many examples could be cited from the discussions. Thus Mr. Gass pointed out that the educational and vocational aspirations of children from impoverished backgrounds are limited, from the child's point of view, by the remoteness of educational stimulation to the daily life of the child's family and neighbourhood. M. Ferrez spoke of rurality as essentially a problem of social rather than geographical distance. He cited a French analysis of courses chosen by secondary school children which indicated the marked relative attractiveness of modern as opposed to classical studies for the children of urban workers compared with those of farmers. Professor Dahrendorf had himself offered a German illustration. In 1955/56 five per cent of the students in West German universities were of working class origin: but the contribution of these students to the numbers reading theology was twelve per cent compared with one per cent in medicine. This uneven distribution, Dahrendorf suggested, was due to the greater remoteness of medical compared with theological studies in the range of possibilities entertained among German working class parents and children. Again Mr. Allison (United Kingdom) pointed to the social distance which prevents parents from understanding educational purposes which their children are the first generation to experience. The vast majority of present day university students, and even most secondary school pupils in Europe, have parents whose educational level is much inferior to their own. Moreover the continually rising standards set at each educational level tend further to widen the gap between the student and his home.

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[1] Below, Chapter 4, p. 94.

Geographical Inequalities

Participants in the discussion were highly appreciative of the account which M. Ferrez[1] and M. Vacheret (France) gave of both the research, which clearly demonstrated the association of wasted or unexploited talent with low population density, and the magnificent programme of educational reform, ushered in by the new law of 1959,[1] which has the reduction of regional inequalities as one of its principal aims.

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[1] Below, Chapter 3.

M. Ferrez' exposition is confined to France but delegates from at least eight other countries contributed to the discussion in such a way as to show that the problem of regional inequalities, and especially the educational backwardness of rural areas, is a common major obstacle to the mobilisation of human resources. Thus, for example, Mr. Jonasson described the problems of school transport in the rural areas of Iceland and Mr. Persson (Norway) contrasted rates of forty per cent passing the university entrance test in Oslo compared with as few as three per cent in some rural areas.

The exact form of the "rural problem", however, differs from one country to another and this was reflected in the different emphases of the various delegates. For Mr. O'Flanagsan, the problem was related to the Irish farmer's custom of inheritance by a single son and the traditional Irish use of education as a first step in emigration which engenders a strong rural demand for schooling. Señor Vilas and his Spanish colleagues laid great stress on family associations as the natural vehicle for rural educational progress, especially in the poorer areas. On the other hand, in Denmark, where regional inequality was described by Mr. Friis as a major problem, the difficulties tend to be formulated as questions of political and demographic planning. In Sweden too, according to Mr. Löwbeer, there are difficulties in ensuring the necessary co-operation between neighbouring rural communities. For Switzerland, Professor Rueff emphasised that urban economic and educational expansion tends to create a chronic shortage of properly qualified teachers in the rural areas. And finally a contribution from M. Geens (Belgium) showed how regional inequalities can be based on differences of cultural and educational tradition between distinct language groups within the same nation. In the French-speaking areas of Belgium, threequarters of the graduates of secondary schools qualify for university entrance compared with less than half in the Flemish speaking areas.

Apart from reaffirming the importance of considering each country against its own particular background of education and social structure, these varying emphases also serve to remind us that behind the label of "regional inequalities" there lies a complex of social, economic and cultural forces which require a comprehensive policy for their amelioration going beyond narrowly "educational" reform to include, as the French plan does, vocational guidance, demographic analysis, regional and community planning and, in short, a wide range of elements of social policy.

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[1] The school leaving age is to be raised to 16 by 1967. A compulsory two year observation cycle has been introduced at the beginning of the secondary stage (11 yrs.–13 yrs.), combined with a system of educational guidance.

Social Class

Social class, like regional inequality, proved to be a guide for the Conference into manifold obstacles which inhibit the education and use of potential ability. Mr. Čalić (Yugoslavia) was the only speaker to claim that class factors had been eliminated in his country. Some other delegates, however, were concerned to stress the non-educational origin of social class factors. Mr. Fletcher (United Kingdom), for example, pointed out that selection for grammar schools in England was a rigorously objective and honest process. The resulting unrepresentativeness of the social composition of grammar schools was attributable to the operation of social forces from outside the educational system.

As we have repeatedly noted, economic development has profoundly modified the context of social forces in which the educational process goes on and changing forms of social stratification are among the most obvious aspects of contemporary economic prosperity. One characteristic feature of these developments is that, as first primary and then secondary education has expanded, so social class wastage in the traditional form of lack of adequate educational opportunity has been, so to say, pushed further and further up into the higher stages of education. The under-representation of working-class children is accordingly most serious in the universities. The proportion of students from the families of manual workers in British universities was estimated at twenty-six per cent in 1956. Recent figures were presented by delegates from other countries which indicated a much smaller degree of democratisation of higher education. Mr. Hartling reported a figure of nine per cent for Denmark in 1959 compared with eight per cent in 1947 and two per cent in 1934. Professor Dahrendorf and M. Martel gave estimates of six per cent for Germany and Switzerland respectively.

Another feature of the changing face of social stratification is its new guise among prosperous post-war populations as a major factor in the determination of educability rather than as a barrier to opportunity. This is the feature of education to which Mrs. Floud addressed herself in an introduction to the discussion of her paper,[1] part of which is reproduced below as the next subsection of this chapter.

There are two ways of approaching the problem of educability. One way is to seek the biological limits of intelligence, a psycho-genetic approach: the other is to study the social determinants of educational performance, a social psychological approach. For the most part, the Conference eschewed the former approach, but Mrs. Floud did briefly take up an issue raised by M. Reuchlin (France) concerning the possibility of genetic differences in ability as between social classes. Such genetic differences could logically be expected to result from movement of intelligent young people into the educated classes within which they would subsequently marry. The ultimate possibility of this "meritocratic" process is, of course, undeniable. But its relevance to the actual conditions with which social and educational policy-makers must deal is extremely doubtful. Mrs. Floud referred to my argument for the hypothesis that *innate* capacities are randomly distributed between social classes[2]—an argument which is based on the polygenetic character of innate intelligence and a consideration of the type and volume of social mobility which has occurred in the history of the present industrial societies. Moreover, whatever the underlying genetic realities, social class differences in tests of intelligence or attainment distort rather than reflect them. And finally, what is of special relevance in this context, is that the distribution of high measured intelligence in typical class structures is such that the largest reserves are among the lower strata, the decreasing proportion of highly intelligent individuals in each lower stratum being insufficient to balance the increase in total numbers.

Turning to the social psychological approach, Mrs. Floud, concentrated on the interplay between home and school in the determination of educational performance.

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[1] Below, Chapter 4.

[2] A. H. Halsey "Genetics, Social Structure and Intelligence", *British Journal of Sociology*, Vol. IX, No. 1, March 1958. For a contrary argument see also J. Conway in *British Journal of Statistical Psychology*, May 1959, and my reply in that journal, November 1959.

Homes and Schools and the Problem of Educability[1]

The social as distinct from the purely academic character of the process of attrition at the secondary stage,[2] is well established. Thus, for instance, it has been strikingly demonstrated that changes in the rank order of children on entry to the English grammar school are not random but are systematically related to their social class origins, so that the proportion of children in the top one-third of the performance hierarchy who are drawn from working-class families falls from about two-thirds to around one-third at the end of the seven year school course.[3]

It is important to realise, however, that social selection disguised as academic selection is a process at work in all schools. We can make ourselves aware of the problem and we can take measures to contain it; but short of abolishing the family we cannot dispose of it altogether. For just as social classes represent distinctive ways of life, so, it is important to realise, do our schools and the teachers who serve in them.

We select the most likely candidates for success in the way of life that our schools represent, and we know something, although not as much as we need to know, about the kind of families which produce children who are, as it were, apt for success in schools as we now organise them. But when we are confronted with children of proven initial capacity, as measured by whatever standards we use in selecting them, who in the event fail, "to give teacher what he wants", we are brought up against our ignorance of the fundamental conditions of success in our schools. We need to ask ourselves, what exactly does teacher want, and how far are his demands justifiable, given certain educational, social, political or economic assumptions and aims?

"What teacher wants" can be thought of quite explicitly in terms of curriculum content and classroom skills—Latin, say, or verbal and arithmetical facility. But it must also be thought of in more subtle terms if we are to understand the processes of social selection in education. Teachers may take for granted and find it reasonable to demand of all children the social equipment with which the average middle-class child tends to come to school; a certain capacity to assume responsibility, a relative independence of mind and breadth of interests. They may demand assumptions about life on the part of their pupils which are in fact "middle-class" assumptions; such as that life is one long progress towards ever deferred gratifications; that the present is always at a discount and the future at a premium; that one must have always a career rather than a job; that the popular pleasures purveyed by the mass-media are at best worthless and at worst sinful.

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[1] I am most grateful to Mrs. Floud for preparing the following edited excerpt from her introduction to the Conference discussion of social class factors.

[2] This is illustrated in Chapter 4, Table V, p. 106.

[3] Central Advisory Council for Education (England), *Early leaving*, H.M.S.O., 1954.

Schools, in fact, make all sorts of tacit social and cultural demands on children to which they are not all equipped to respond, and it is worth making the point that the tendency for the gap between the demands and assumptions of the school and the skills and assumptions that the children bring with them is widening. This is partly because the social composition of our secondary schools is becoming increasingly representative of the population at large and they contain a substantial minority, in some areas a majority, of pupils from working-class homes. It is also because the effect of current competitive pressures is to load examination syllabi and push minimum standards of acceptable performance ever higher. Every year the dice is loaded more and more heavily against children from underprivileged homes and in favour of those who come with an initial set of cultural advantages in the shape of parental supports and pressures, which are in the same direction as those which the school expects them to be. The children from culturally impoverished homes can spend to-day less and less time on the pursuits which might conceivably mitigate the effects of their impoverished background, and the schools have at least two jobs to do in present circumstances. They have not merely to instruct their pupils up to an ever rising standard of competence; they have also to tackle for an increasing proportion of their pupils all sorts of educational tasks normally undertaken in a middle-class home by parents with at least some degree of education analogous to, or comparable with, that to which the child aspires or is entitled by virtue of his ability.

If to equalise opportunity in the interests of maximising the flow of talent is the aim of policy, then the implications of our growing understanding of the relations between home and school are very radical—much more radical than was foreseen when governments first began to remedy material defects in children's homes by distributing free milk and meals. As family environments change demographically, economically and culturally, together with the structure of opportunities in the labour market, the organisation of education must respond to the same pressures so that full advantage can be taken of the changing patterns of demand.

The necessary measures may be primarily political and administrative in character—it may be a question of re-organising schooling along "comprehensive" or "common school" lines, if it can be shown that this will make for a longer average school life and greater fluidity in the supply of labour. But other measures may be indicated. Thus, recent work on social-class differences in linguistic capacity indicates that the handicap which reflects itself in the poorer average educational performance of working-class children is deeply rooted in the social structure of working-class community and family life.[1] In groups of working-class children, particularly those from semi- and unskilled families, scores on verbal tests are grossly depressed in relation to scores at the higher levels of non-verbal tests. It seems that the very nature of his ability is profoundly influenced by the social environment of the child; and that the linguistic handicap of working-class children becomes a more general intellectual handicap at the secondary stage of education. Successful learning may, therefore, be dependent on different educational measures for children of different backgrounds. Bernstein[2] infers the proposition, for instance, that the more humble the origins of pupils the smaller the optimum number in class. One might also infer the need for financial re-allocation as between primary and secondary education so as to make extremely small classes the rule in the early stages of primary education rather than, as is now customary, at the advanced stages of secondary education. A truly radical and single-minded policy might also find a use for boarding-schools.

However, here is not the place to do more than indicate the radical implications of the policy of equality of opportunity in the present state of sociological knowledge. Suffice it to say that it involves us in the need for a most elaborate inspection of what actually goes on in schools, of what the assumptions and values are that have been embodied in their organisation, of what tacit as well as explicit demands they make on pupils. At the same time, we need a very much deeper knowledge than we have now of the social and cultural environment of children of different social origins, and of the extent to which they are correspondingly more or less capable of responding to the intellectual and social demands with which school confronts them.

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[1] Cf. B. Bernstein, "Social Structure, Language and Learning", *Educational Research*, III, 3, June 1961, pp. 163–176.

[2] *Ibid.*

Adolescent Culture

One factor of growing importance in the web of social forces which encircles the school did not find a place in the discussions. This is the adolescent culture itself—what the American sociologist, James Coleman, calls "a society within society"[1] which, especially in affluent America, maintains a semi-independent existence with its own social equipment, institutions and values. Recent research by Coleman and his associates has demonstrated the existence of a powerful influence by adolescent groups over the norms of academic output of the American High School. The values of the American adolescent culture are such that it cannot be assumed that those who exhibit the highest academic attainment are necessarily the most able students. Members of an adolescent group may be pressed to channel their abilities in non-academic directions and may be punished as "deviants" if they do not do so. All social groups, of course, generate their own norms of output, and resistance to the adoption of academic goals is by no means foreign to European experience. Nevertheless, the context of restricted and selective access in which European secondary and higher education has traditionally worked, has excluded the appearance of a separate adolescent culture as an *educational* problem. But some of the basic features of advanced industrial society, especially the relative rise in the status, power and freedom of youth, combined with educational expansion, point to the adolescent culture as a potent future influence on the effectiveness of schools and colleges.

The Structure of Education

Discussion of Professor Husén's paper,[2] and the most impressive body of research on which it is based, again brought out the complex invasion of school by home and home by school. The school class has, indeed, to be seen as a microcosm of the wider social structure in which both teacher and pupil live. Husén himself emphasised the need to look at schools in more than pedagogical terms in order to answer questions, with which his paper deals, concerning the influence of the structure of schooling on the supply of talent to society. On these questions the Conference demonstrated that both passions and research evidence are at once abundant and vague.

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[1] Cf. James Coleman, *Adolescent Society*, N.Y. Free Press, 1961.

[2] Below, Chapter 5.

Least clear, perhaps, is the overall importance of curriculum, type of organisation, teaching technique, etc., in themselves rather than in interaction with the social forces which impinge upon them. Professor Dahrendorf (Germany) pointed out that, though the structure of educational systems showed immense variety, wastage of talent was endemic, and he went on to conclude that the reduction of wastage was to be sought more in social than in educational reform. This argument serves to highlight a division between two modes of educational progress. In some countries, notably Sweden and Norway, educational reform constitutes an abrupt departure from the traditional structure of education, with its restricted scope and its separation of school according to the social origins and occupational destinies of the pupils. In other countries, such as Britain and Switzerland, educational change tends to take the form of response to established social change and to be highly conscious, as Mr. Fletcher (United Kingdom) emphasised, of the desirability of retaining the traditional virtues of tested institutions.

An indictment was launched by Professor Langeveld (Netherlands) against the traditional European type of secondary school preparing for university entrance. Langeveld reported research findings from his own country, indicating high rates of failure in, and wastage from, selective secondary schools and, what is most serious, that failure is especially likely among very highly intelligent pupils. He specified, as two important causes, an overloaded classical curriculum and inefficient teaching methods. Though many delegates were not entirely persuaded of the ubiquity of poor teaching methods in the grammar school. the lycée and the gymnasium and though Mr. Allison pointed to the dramatic reduction in early leaving which has occurred in English grammar schools in the 1950s, the attack was pressed further in discussion of Husén's judicious review of the efficiency of selection methods and still further on the basis of his "tentative conclusion" from the Stockholm study[1] that "when selection in a double stream system is made at an early age, a large amount of talent is 'lost'. A reasonable hypothesis is that if 'creaming-off' the academically talented is postponed to a later age, or if they are taken care of within a more flexible comprehensive system, they are more likely to commit themselves to a longer and more promising school career". Mr. Edenman had, earlier, asserted the principle that "the compulsory school should not resort to systematic differentiation of pupils before the pupil's choice of future course of studies can coincide with vocational education"[2] and Mr. Persson now described Norwegian plans for a system of six year primary followed by three year common compulsory secondary schooling.[3]

The issue could then be joined in a discussion of the merits and demerits of the common school.[4] In this debate it was noticeable that the onus of proof was accepted by the proponents of change. Certainly the advocates of the common as opposed to the separated[5] school were markedly more in command of relatively compelling scientific evidence compared with their opponents.

The argument, however, was inconclusive and crucial problems remain to be clarified by further research and experience. Nevertheless the ebb and flow of discussion was such as to make it impossible for the attentive participant to go away with a simplistic attachment to either of the extreme views. For example, there was agreement that a variety of educational provision is essential in all countries if only as a necessary recognition of the existence of a variety of potentially educable talent. This principle is a wise one whether the framework of the educational system is to be common or separated. Hence one must applaud the arrangements for flexibility and variety of courses which are included in the plans for Scandinavia, where the movement towards common schooling is as strong as anywhere among the Member countries of O.E.E.C. It should also be noticed that, in countries like Britain and Switzerland, there is a great variety of educational structure from one county or canton to another.[1] Flexibility, as Mr. Fletcher argued, is introduced into the English tripartite system by transfer of pupils and, what is of increasing importance, by overlapping of courses, to produce a sharing of educational functions between types of school which, historically, were sharply demarcated. Moreover it is possible for a common school to be rigidly separated in practice through its internal organisation.

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[1] Below, Chapter 5, p. 127.

[2] In his Opening Address.

[3] The 7th Grade will be completely undifferentiated and in the 8th Grade there is to be a free choice between types of course.

[4] The use of terms in international discussion of this topic is beset with notorious difficulties. In England the common school is often called 'comprehensive' or, in cases where academically separate 'sides' or schools share the same campus, 'bilateral' or 'multilateral'.

[5] By using the term 'separated' I intend to avoid the misleading word 'segregated' and the rather vague appelation 'differentiated' which is also often used. The English term 'tripartite' refers to the secondary system of separate grammar, technical and so called 'modern' schools.

Following Professor Husén's lead, a good deal of light was thrown on the problem of undifferentiated versus academically selective or "streamed" school classes. It is misleading to think of the individual child as the unit in this kind of discussion. The relevant pedagogical unit is the child *at a given stage in a given subject.* In other words there can be no doubt that "setting" is pedagogically superior to "streaming", whether it takes place in a common or a separated school. On the other hand, Mr. Allison (United Kingdom) argued skilfully for the separation of the talented, emphasising the advantages of competition of like with like, the disadvantages to able children of being held back in their early years and the stimulus of homogeneous classes to good teaching. He cited the Swedish evidence that able working-class children may profit from selective teaching. However, when all the evidence was assembled, as Husén puts it,[2] "this alleged superiority of the selective type of pedagogical milieu is not strongly supported by the findings . . . From the point of view of intellectual development, there is at least no disadvantage for the pupils who come from the kind of homes that have hitherto in most European countries supplied the academic type of school with most of its pupils, to remain with their fellows up to the age of 13". The contribution of educational organisation to maximising the flow of talent therefore involves the combination of two aims specified by Dr. Wolfle among the conclusions of Chapter 2, namely early identification and late separation.

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[1] Though, as Mr. Elvin pointed out, it is dangerous to argue from formal structure to daily practice, and a realistic comparative education should be used by the scholar to expound the realities of practice in his own country as much as a duty to study the formal structure of education in other countries.

[2] Below, Chapter 5, p. 132.

The Inevitability of Selection

Whatever the structure of education, it must be recognised that selection in some form is inevitable. It may appear as restricted entry to, or elimination from, types or stages of education, or as voluntary choice; it may be social or intellectual; it may be early or late. In whatever form, it must exist so long as education systems are called upon to produce the differentiated skills required in an advanced society. The question, therefore, arises as to whether educational rejection is to be regarded as social waste. Here is a neglected object of comparative research on which the Conference had, perforce, to accept opinion in place of evidence. In the traditional elitist systems of European education it seems that educational failure is defined subjectively as catastrophic whereas, in America, where guidance of individuals tends increasingly to be substituted for selection of groups and where, as Burton Clark puts it,[1] students are "cooled out" rather than thrown out of the educational system, it may be that failure to reach the highest academic qualification leaves the individual less handicapped psychologically in his capacity to follow certain occupational aspirations. From this point of view, we lack adequate research on the non-educational factors in occupational choice and on the significance for the supply of trained manpower of the enormous expansion of formal educational activity within modern industry itself.

Section 4. PROBLEMS AND CONCLUSIONS

In heeding Mr. Elvin's warning against an attempt at elaborate formulation of recommendations to Member and associated countries of O.E.E.C., the Conference, I think, gained valuable discussion and escaped from protracted drafting of empty formulae. The expert contributions in the following chapters do, of course, contain precise conclusions, some of which (for example those of Dr. Wolfle[1]) are of considerable generality and all of which may be translated into recommendations for social and educational policy. While commending these to the reader, I would like also to underline some of the problems and conclusions that emerged from the Conference as a whole.

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[1] Cf. Burton Clark, *The Open Door College*, N.Y. McGraw-Hill, 1960.

The task of pressing forward towards the ideal of an *educative society,* offering to all citizens every possible access to the cultural heritage, is one which now engages the imagination of all nations. A more efficient mobilisation of reserves of scientific manpower is a powerful instrument to this end. Ultimately this aid to progress carries with it the danger of a new tyranny of economy over education. But as a more immediate prospect, any response by educational systems to the modern demand for scientific manpower is, at the same time, a service to the aspirations of individuals towards a better life.

No country can reasonably be satisfied with present social arrangements for converting potential human creativity and skill into actual achievement. Waste and frustration are apparent everywhere. At low levels of economic development the barriers are massive and material—the obvious correlates of a backward economy. Among economically advanced nations these barriers are increasingly subtle, failures of motivation and values—barriers of cultural distance. The characteristic expression of waste in poor countries is a dearth of educational opportunity. With economic growth, waste hides behind complex manifestations of imperfect educability. For poor countries the scientific and policy problems are straightforward; but at each step forward towards an advanced modern economy the problems of understanding become more difficult and their translation into policy more expensive.

On the other hand, the greatest encouragement to countries that seek a society which is both educative and materially rich, is that the pursuit of this double aim involves a virtuous ascending spiral. Human ability is socially defined; the more complex the culture the greater the talent that a society demands of its people. But also, the more complex the culture in its application to the productive organisation of society, the greater are the resources available to convert potential into actual ability. Thus, economic growth may be said to create the very skills that it demands. Again, it is only with economic advance that a nation can afford to go beyond the ideal of formal equality of educational opportunity to the higher ideal of substantive equality of opportunity for every individual to develop his latent ability.

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[1] Below, Chapter 2.

The problem, therefore, seems to me to be one of ensuring translation of a growing body of knowledge concerning impediments to education and educability into policies for particular countries at particular stages of their development. This task has many difficulties. General knowledge in the social sciences is of varying relevance and is accumulating rapidly. Its application is hampered by the paucity and unreliability of the available statistics, and the need for further work on problems of common international interest is obvious.

Solutions, however, will depend not only on international co-operation, but also on greater efforts towards self-knowledge by individual countries. For example, though adequate methods of estimating reserves of potential talent are available to all, very few countries have taken advantage of them. Indeed, more generally, the standards of data collection by governments on crucial issues of social and educational policy is often woefully low. It is a wasteful use of the short supply of professional social scientists that they should so frequently have to spend their time in the private collection of publicly required information. The basic data of educational change, such as the social composition of recruits to different kinds of schools, wastage rates, parental preferences, occupational demands and aspirations, etc., should be collected as a routine operation of Ministries of Education. Only in this way can national educational policy-makers take on their new responsibilities towards economic and social development.

Even with a great improvement in the means of decision-making, the logistics of educational development set many dilemmas. For example, if in the short run social priority is given to raising the supply of urgently required scientific manpower, then the corresponding educational priority may be university expansion; but if the social priority is to develop education opportunity as quickly and widely as possible, the appropriate educational priority might be to expand primary and secondary schooling. Rational educational programmes can be worked out only in the light of clear social priorities. At the same time, the need for continually renewed scrutiny of the efficacy of the educational process itself hardly needs reiteration. As social structures change and educational systems expand, so the determinants of educability, of the nation as of the individual, also change. Accordingly, in relation to the ever changing constellation of social forces of region, class, neighbourhood and family, there is need for constant study of teachers and teaching methods. Our educational "production methods" can never be perfect.

As a final glance towards the future of educational expansion, it may be useful to make brief reference to the relevance of past and present in America for the prospect facing European countries. It is not only, as Mr. Dees (U.S.A.) reminded us, that everything is true about America—that everything in the way of educational excellence and educational scandal is to be found there—but that, in some respects at least, America has anticipated in her history the aspirations of many countries in Western Europe. Comparisons between American and Russian experience are instructive too since, in Russia, educational expansion has been even more consciously and closely related to the requirements of economic growth. Such comparisons would throw valuable light on the question of the ultimate balance between education for production and for citizenship.[1] American experience is also relevant as a guide to the dangers and difficulties which attend the expansion of secondary education. Thus, the vacillations of educational policy during the rapid development of American secondary education[2] offer valuable lessons to Europeans of the problem of maintaining high academic standards in secondary schools, as they are transformed from a highly selective and narrow social base to become social as well as educational organisations for the mass of adolescents. At the same time, it is necessary to point out the massive irrelevance of American experience. For most European countries the task is not one of extending mass education upwards through higher and higher stages *de novo*, but rather one of remodelling traditional systems which grew up in response to forms of society at an earlier stage of economic and social development. Nevertheless, within the context of the general need for comparative study which was revealed by our discussion, the great value of critical appreciation of the history of American education in relation to economic growth is beyond doubt.

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[1] Thus over half of all U.S.S.R. university graduates are scientists or engineers compared with less than a quarter in U.S.A. "The 'extra' output of American graduates in the humanities and social sciences mainly reflects the professionalisation of the tertiary sectors of American industry and may be viewed as an adornment of the affluent society, which Russia has yet to become", A. H. Halsey, "The Changing Functions of Universities in Advanced Industrial Societies", *Harvard Education Review*, Vol. 30, No. 2, Spring 1960.

[2] A fascinating account of these actions and reactions in American educational thought was given to the Conference by Mr. Maucker (U.S.A.)

The new alliance between education and economics holds out the promise of a richer life for millions who would otherwise exist far below their potential human stature. The challenge to governments, and their economic and educational advisers, to pursue this promise is a noble one.

CHAPTER 2

NATIONAL RESOURCES OF ABILITY

Dael WOLFLE

NATIONAL RESOURCES OF ABILITY

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A free society holds as one of its basic ideals the right of each person to develop to his full capacity. Thus, the constitution of Italy assures its citizens that "the capable and meritorious, even though they be without the means, have the right to enter the highest levels of instruction." The constitution of Bavaria declares that "every young person, irrespective of his origin and economic status, has the right to education and training suitable to his potentiality." The education law of the United Kingdom gives assurance that the nation's schools are not considered sufficient unless they "afford for all pupils opportunities for education offering such variety of instruction and training as may be desirable in view of their different ages, abilities, and aptitudes." The form of statement differs, but the provision of educational opportunity for all, regardless of social or economic class, is one of the basic ideals of a democracy.

This democratic ideal is now reinforced by economic necessity. In the document that called this Conference together, the O.E.E.C. states that "countries may not be able to sustain economic growth unless all the reserves of talent in the population are actively sought out and attracted into needed educational channels. This applies particularly to science and technology, where the need for talented individuals is expanding more rapidly than in most other sectors. Thus the importance of identifying and fully developing the talents of young people, which is important in its own right, quite apart from economic needs, is reinforced by the imperatives of economic development."[1]

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[1] Organisation for European Economic Co-operation, *Conference on the Identification and Education of Talent for Scientific Studies*, O.E.E.C., STP/GC (60) 24, 1960.

In the years since World War II, many nations have come to realise that their future welfare will become increasingly dependent upon the availability of an adequate number of persons well educated in science and technology. Thus they have undertaken to study and compare their own educational trends with their national needs. As a part of these studies, several countries have sought to determine the size of the intellectual reserve that is not being fully educated or utilised. Professors Härnqvist and de Wolff have reviewed the studies of intellectual reserves in a paper prepared for this Conference.[1]

To take stock of a nation's intellectual reserves is a powerful aid in bringing the nation's educational system into balance with its needs. Such studies are valuable, but it is necessary to examine the nature of intellectual resources in a more fundamental manner in order to demonstrate that, within broad limits, the amount of talent available to a nation is subject to national control. The whole purpose of this chapter is to demonstrate that the intellectual reserve of a nation is not a fixed quantity which the nation can use or neglect. Rather it is a variable that can be increased or decreased, a variable that depends upon the customs and policies of the nation, its system of education, and the manner in which young people are encouraged and motivated to improve themselves.

I will consider some of the factors that prevent a nation from developing its resources of talent as fully as it might and will describe some of the methods by which the amount of talent available to a nation can be increased.

THE INHERITANCE OF ABILITY

If we were considering any species other than man—if, for example, we wished to improve the quality of cattle, or poultry, or one of the cereal grains—we would start by considering selective breeding, hybridization, and the genetic basis of the qualities to be improved. It is not necessary to explain why we do not use this approach to the problem of improving human talent, but it is useful to start with the genetic basis of ability, because the knowledge of genetics and a great deal of successful experience in improving plant and animal stocks give assurance that genetic means could be used to improve the human stock if society were to decide that such means were desirable. Even the hypothetical possibility of improving the human stock through genetic means constitutes evidence that the amount of talent in a nation is not a fixed quantity but rather is a variable that can be changed.

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[1] Below, Chapter 6.

How much of the differences in human ability can be attributed to inherited factors and how much can be explained in terms of differences in education and environment is an interesting psychological problem, but a problem that is irrelevant for this Conference. The nature-nurture controversy is an old one, but we cannot solve it here. Instead, therefore, of getting mired in arguments over the relative importance of nature and nurture, we will concentrate on those elements that can most readily be changed to increase our intellectual resources. These elements are environmental.

ENVIRONMENTAL DETERMINATION OF ABILITY

Within limits, the environmental factors can be manipulated if those in authority decide that it is desirable to do so in order to develop more fully the potential supply of talent.

The kind of social or environmental variables involved can easily be illustrated. The school system is an obvious example. The duration of required education, the level of performance required, the relative emphasis upon science and upon other subjects, the nature of the educational and vocational guidance given to students, the methods used to select students for the next higher level of education, and a number of other characteristics that vary from time to time and from country to country help both to determine the total amount of talent available and the relative amounts in different fields of interest.

There are also personal, family, and community variables that help to determine the flow of talent—for example, the amount of public attention given to education; the types of behavior that are socially rewarded by the community or the family; the kinds of clubs, entertainment, and reading material made available to children outside of school; and the general traditions of a particular ethnic group that bend a child in one direction or in another.

The existence of these differences is generally recognised, but sometimes we fail to realise the extent of their influence in determining how many young people will secure an education and what kind of education it will be.

Yet the strength of these influences is very great, as the chapter by Jean Floud demonstrates.[1] A recent report[2] from the United States shows both the extent to which personal family background helps to determine the likelihood of university entrance and the existence of a substantial intellectual reserve. The National Merit Scholarship Corporation, a privately financed corporation, last year awarded 831 scholarships to students entering universities. The scholarships vary in amount, depending upon the student's need. They may be as much as $2,000 a year, and are tenable for four years.

An examination of the occupations of the fathers of the 831 scholarship winners shows 25 per cent of the fathers to be in manual service, and lower clerical occupations. As examples, 14 were farmers, 16 were machine operators, 2 were truck drivers, 8 were postal clerks, 1 was a janitor, etc.

All of the students were of high quality. They were the 831 judged to be best out of 550,000 who took the first qualifying examination. The winners were selected on the basis of test scores, grades earned in high school, recommendations by teachers, evidence of leadership, and evidence of creative achievement outside of the classroom. Truly they were a select group.

The conclusion to be drawn from the statistics on occupations of the fathers seems obvious. The relatively large group of manual workers, farmers, minor clerks, and men employed in service occupations contributed only one fourth of these highly selected scholarship winners, while the smaller group of fathers in the professions, business management, and other "higher" occupations contributed three fourths of the scholarship winners. There is certainly an intelligence difference between these two large occupational groupings. But, equally certainly, the intelligence difference is not as large as the difference in the number of scholarship winners. Even in as open and socially mobile a society as that of the United States, family background exercises a large influence on the educational achievement and motivation of the child. The corollary is that even in such a society there is a substantial reserve of potential intellectual talent that is not developed.

Similar social and cultural differences are to be found elsewhere. In Sweden, the probability of successfully completing the "studentexamen" is from 20 to 40 times as great for young men and women living in Stockholm as for those living in remote rural areas. In every country, urban children tend to remain longer in school than do rural children.

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[1] Below, Chapter 4.

[2] National Merit Scholarship Corporation, *A Pledge to the Future* 1960 annual report), Evanston, Illinois, 1961.

In some countries, peasants are reluctant to have their children secure more than an elementary education for fear that they will move away from the social class of the parents.

In England, the percentage of Sixth Form boys specialising in science has doubled in the past few years.

In many countries, children of Jewish families are more highly motivated to secure a good education than are children of other ethnic backgrounds.

Such demographic differences as these profoundly influence the amount, the quality, and the special interests of a nation's intellectual resources. If we wish to increase the amount of talent available, we can study the influence of such variables and then do all we can to remove the barriers that now limit the extent to which we develop our potential resources.

If we wish to increase the number of well-trained scientists and technologists, if we wish to have a larger fraction of potential ability become fully developed ability, we can do so by manipulating the social forces that play upon a child as he is growing up. The word "manipulate" is used deliberately to emphasize the fact that the social forces are important, and because to some extent these forces can be changed in the direction that society considers to be most desirable.

There are three types of factors that can be manipulated: the national policy and social climate under which a child is reared; the strength of individual or personal motivation for education; and the nature of the educational system.

National Policy and Individual Worth

In any society, as Gardner has brilliantly analysed,[1] there are always contesting forces tending, on the one hand, to recognise, encourage, and promote individual merit, and, on the other hand, to suppress individual differences. We think of the Dark Ages as a society of lords and serfs, with position dependent upon birth rather than upon ability, yet the Catholic Church provided opportunity for advancement to the able and ambitious young man of undistinguished birth; as Müller[1] has pointed out, "at least half of the medieval popes were humbly born". China has for centuries been a country of marked social stratification, yet many generations ago China developed a civil service system under which appointment depended entirely upon examinations that were open to anyone, regardless of class or caste, a civil service system that lasted into the present century.

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[1] John W. Gardner, *Excellence*, Harper and Brothers, New York, 1961.

In our own day we see the same opposing forces. Each nation has developed means for identifying bright young people, encouraging them to secure advanced education, and rewarding them with promotion to higher levels. Yet there are always barriers to this process. Sometimes there is marked social stratification, in which the opportunity to secure an education and the kind of position which a youth can hope to attain are largely determined by the social class into which he was born. Elsewhere there have developed strongly held beliefs in social equality that make it seem "undemocratic" to provide opportunities for bright children that are not provided for all children. Although the method is quite different from that of hereditary social structure, equalitarianism also tends to minimise the opportunity for youth of great ability to rise above the common level.

If we imagine a continuum extending from one nation which puts maximum emphasis on individual performance to a nation at the other extreme which places maximum restraints on individual performance, the actual nations will all fall somewhere between the two extremes. In democratic Sweden, in communistic Russia, in the caste system of India and the almost classless society of Australia, in industrial regions and agrarian ones, in rich nations and in poor ones, there are means for recognising individual merit, and there are also social and economic forces that make the paths to education and position easier for some children than for others.

How a nation resolves these contrary forces is a matter of social policy, social policy that has gradually developed throughout the nation's history, but social policy that can to some extent be deliberately changed by government action. If a nation wishes to increase its resources of talent, it can examine its own social policies and take such action as seems desirable to place greater emphasis on the identification and encouragement of talented youth from wherever within the nation they may come.

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[1] Herbert J. Müller, *The Uses of the Past: Profiles of Former Societies*, Oxford University Press, 1952.

In some countries, it seems to be the official policy that only a small number of persons in each generation is qualified for higher education. In other countries, the official policy is at the opposite extreme and seems almost to hold that with proper preparatory education, anyone can become qualified for the university. The truth lies between these extremes. Some young people can become qualified for university work; others cannot. But the number who can is larger in any country than the number who actually do. In general, the more industrialised countries, those with a higher general level of education, and those with the greatest demand for scientists, engineers, and highly educated persons in the other professions find a larger percentage of their young people to be qualified for university-level education than do those countries that are less highly developed. When there is a need for more educated persons, more persons are found to be qualified for higher education. This fact suggests that many nations that now educate only a few of their young people to the university level could, with changed policies, educate a much larger number to that level.

Motivation To Become Educated

There are several requisites for becoming a well-educated person. Four merit special attention. First, of course, there must be high enough intelligence to allow the boy or girl to profit from his schooling and to reach a fairly high educational level.

Second, the young person must have an active interest in studying and learning. He sees education as something valuable and interesting into which he enters actively and with pleasure.

The third requisite is that the child develops a concept of himself as a scholar or professionally trained adult. This objective must be seen both as a realisable life goal and as an attractive and satisfying one.

The fourth requisite is that there be a fairly clear pathway leading to the goal. There must be appropriate schools; the child must be able to take advantage of the education they offer; and there must be a reasonable prospect of a suitable position when his schooling is finished.

Society cannot do much to improve the intelligence of a particular child. But society can help to motivate him, to give him an active interest in studying and learning, and to help him to develop a concept of himself as a scholar or professionally educated adult. And society can do a great deal to provide the educational opportunities that are necessary if this goal is to be reached.

Sidney Pressey[1] has written a provocative article on the care and nurture of genius. Why is it, he asks, that Europe a century or two ago produced so many excellent musicians and that the United States in the twentieth century has produced so many excellent athletes? He answers his own question by pointing out that the social conditions were just right to encourage the development of these particular kinds of talent. The right conditions are, first, great popular interest; second, many opportunities and much encouragement for the young who are interested; and third, popular acclaim and social prestige for those who are successful.

Thomas Macaulay, over a century ago, explained in a similar fashion why Athenian orators were the greatest the world has seen. In Athens, he wrote, "oratory received such encouragement as it has never since obtained," and then proceeded to generalize: "Genius is subject to the same laws which regulate the production of cotton and molasses. The supply adjusts itself to the demand. The quantity may be diminished by restrictions and multiplied by bounties."[2]

Macaulay oversimplified the problem, but we should pay attention to what he says nevertheless. Whether Russian social planners based their strategy on Macaulay or on some other wise observer, they have followed this technique in bringing about a great and rapid increase in the number of scientists and engineers in Russia. The importance of these fields is widely emphasized; schools and science clubs provide many opportunities for the student who is interested in science; there is much pressure to succeed in these fields; those who do succeed are richly rewarded with social prestige and with salaries and other financial advantages far above those accorded to workers in other fields.

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[1] Sidney L. Pressey, "Concerning the Nature and Nurture of Genius", *The Scientific Monthly*, 1955, 81, pp. 123–129.

[2] Thomas B. Macaulay, "On the Athenian Orators" (August, 1824), in *Macaulay Complete Works*, Volume XI, Longmans Green & Co., 1898, p. 340.

How can this formula or strategy be used to increase a nation's intellectual resources?

The answer to this question depends upon the nation. Each nation must analyse its own problems and arrive at its own answer. Nevertheless, some general principles may be useful:

a) The less developed a nation is—economically, industrially, and educationally—the more likely it is that first attention should be given to increasing the number and improving the quality of the schools so that the nation will be able to educate the leaders in science, engineering, agriculture, medicine, administration, government, and education that will enable the nation to reach a higher stage of development.

b) The more rigid the class structure of a nation, the more likely it is that major attention should be given to removing the financial and motivational barriers that prevent bright children from the lower social classes from securing higher education.

c) The wealthier and more highly developed a nation, the more likely it is that major efforts should be made to increase the educational motivation of its young people.

As specific examples, the new nations of Africa need schools, France needs greater democratisation of its educational system, and the United States needs greater interest and motivation on the part of large numbers of students who are in school but who are not interested in taking full advantage of their educational opportunities.

In the development of a country, ordinarily the first of these needs is for schools. Many years ago John Locke wrote: "There are some men's constitutions of body and mind so vigorous, and well framed by nature, that they need not much assistance from others, but by the strength of their natural genius, they are from their cradles carried towards what is excellent; and by the privilege of their happy constitutions, are able to do wonders. But examples of this kind are but few, and I think I may say that of all the men we meet with, nine parts out of ten are what they are, good or evil, useful or not, by their education."[1]

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1. John Locke, *Some Thoughts Concerning Education.*

The Educational System

There are seven features of the educational system that merit special attention because they directly influence the extent to which latent intellectual resources are developed, and because they can be adjusted or changed to influence the amount of talent available for higher education.

1. *Age of separating streams.* In any school system there comes an age at which the students are separated into two or more groups. At least one group is considered to have sufficient ability to continue to high educational levels and is therefore encouraged to enter an educational stream that leads on to the university or to other institutions of university level. (Sometimes this stream is further divided into smaller groups headed for different forms of higher education.) Another group is not considered qualified for advanced work and is offered terminal or vocational courses.

The age at which this separation is made helps to determine the basis of selection for the academic stream and the size of the group that eventually becomes qualified for advanced work.

It is necessary to recognise that the selection is, at very best, quite imperfect. Mistakes are always made; some who are selected for the academic stream are not up to that mark, while some who fail of selection have the ability to do satisfactory academic work and can become qualified for education at an advanced level. The number of mistakes is greater when separation takes place at an early age than when selection is postponed for a few more years. Since those who are mistakenly excluded from the academic stream can only under exceptional circumstances later be transferred to that stream, the result is that the size of the group considered qualified for advanced work is smaller if separation is made at an early age than if separation is made later.

Related to this disadvantage of early separation is the fact that the basis for selection changes with age. Whether boy or girl starts school with an interest in learning depends primarily upon the kind of home from which he comes. If the parents like to read, if there are books and magazines around, if the child is accustomed to hearing discussions of ideas, if learning to read has been presented to him as being something desirable, the child is likely to enter school with attitudes favorable to the educational process. On the other hand, if there are no books at home, if the parents have no intellectual interests, if education has not been made to seem desirable, the child is not so likely to be eager to start his own education. This handicap of children from the poorer and less well-educated classes undoubtedly persists through a number of school years; in fact, it sometimes persists indefinitely.

If the separation into streams is made at an early age, the children from the higher social classes, the "nice" children, the ones whose parents gave them a good start, will adjust to school more easily, and will therefore appear to be better students and will be more likely to be selected for the academic stream than will children of equal potential ability but less initial advantage. In other words, as Professor Husén has pointed out, if the separation is made at an early age, say age 10 or 11, selection for the academic stream is more likely to be made on a social class basis than if separation is postponed until a later age, say 14 or 16.

The age of separation into streams is, therefore, an important determiner of the extent to which the school system accurately identifies and classifies students of different levels of ability. If separation is postponed to a later age, selection can be made more accurately and upon the basis of better evidence concerning intellectual ability.

2. *Early identification of able students.* In order to take full advantage of the opportunity offered by postponing the time of separation into two or more educational streams, it is important to start early on the attempt to identify those students who have high ability. They may all be kept together in the same school and perhaps in the same classes, but the effort to identify those of high ability should start at quite early school ages.

Neither the school nor the state can do much about the individual home in which a child is reared, but as soon as the child starts school, it is possible to reinforce the positive attitudes that some children bring with them and to build up more positive attitudes in those who are intelligent but who are poorly motivated. It is important to start this process early. A recent study[1] of students in their 12th year of school contrasted those who were doing high quality work as judged by their intelligence test scores with those who were not doing as well as their relatively high intelligence test scores indicated that they should. The point of special interest in this study was the year in school in which the differences between overachievement and underachievement began to appear. The difference started in the first year of school. It was not significant, in the statistical sense, until the third year of school, but right from the beginning the ones who were underachievers in the 12th grade got off to a poorer start than did the ones who were overachieving in the 12th grade. The obvious implication is that during the early years of school, teachers should try to identify those children who are bright but who are not doing work commensurate with their ability. Identifying these underachievers is the first step toward whatever special attention seems most likely, in each individual case, to result in better achievement and better attitudes toward school work.

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[1] Merville C. Shaw and John T. McCuen, "The Onset of Academic Underachievement in Bright Children", *Journal of Educational Psychology*, 1960, 51, pp. 103–108.

3. *Diversity of selection.* The means used to select students for the next higher educational level can either enlarge or restrict the supply of talent. When selection is based, as it frequently is, on the sum or average of all school grades, or when selection is based on a test of general intellectual aptitude, the first students to be selected are those who are high in all respects. These exceptional students will come through on any reasonable basis of selection. But it is not only the very best who must be chosen; some who are not quite so able must also usually be included. It is at this level that general measures of intelligence or grade average may unnecessarily restrict the processes of selection. For at this level, such tests tend to pick out students of moderately high average rather than those who are very superior in one or two lines, but merely competent or even mediocre in others. This latter group merits special attention, for, as is shown both by experience and by some experimental studies, a goodly number of these students who are outstanding in one or two lines but not so high in other lines turn out to be among the best in later life. If to those who are generally superior we add those who are highly superior in one or two fields, we can approximately double the number who are considered capable of advancing to the next higher level.[1]

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[1] Dael Wolfle, "Diversity of Talent", *American Psychologist*, 1960, 15, pp. 535–545.

4. *Guidance.* Related to the questions of selection for a more advanced level is the matter of student guidance. In some school systems, there are special officers whose function is to provide students with educational and vocational guidance. In all schools, the regular teachers provide some of this guidance. At its best, a guidance program can help a student to clarify his own educational and vocational goals, can help him to secure information about the training necessary to enter a vocational field he is considering and about the nature of the work and life that would be his if he does enter the field he is contemplating. The counselor can also bring together the information from school grades, tests of aptitude and ability, and other sources, and help the student to decide whether or not he is fitted for the career he is contemplating. At its best, a school guidance program can be of valuable service to the students.

A guidance program can also serve as an instrument of national policy. In no country that honors personal freedom will a student be forced into a professional field against his will. But if there is a special need for doctors, or teachers, or engineers, the need, the educational opportunities, and the inducements can be explained to students who have the required ability. Those who also have the interest can be helped to get into the proper educational channels.

Whether or not there be special guidance officers, there is one kind of educational counseling in which teachers, school administrators, and officers of the Ministry of Education responsible for curriculum planning can all be helpful. That is in keeping the doors of educational opportunity open. If a student is ever to become an experimental scientist or a well-trained technologist, he will need a substantial grounding in mathematics. If at the age of 14, or 15, or 16 he is allowed to stop taking mathematics because he does not expect to follow a scientific line, we have, in almost all cases, solidly closed one of the doors that lead to a scientific or technical career. If he later decides he would like to study science, he will be severely handicapped by his lack of mathematics. And if his interests continue along lines other than science, the further study of mathematics for a few years will still be a valuable part of his education.

Mathematics is an example. But there are also other ways in which the doors to further educational opportunity can be kept open, or can be firmly closed. The school that includes all students of a given age, although it presents other difficulties, has as one of its advantages the relatively easy possibility of switching from one stream to another, something that can much more easily be done if all students are in the same school than if they have at an earlier age been sorted out into different schools.

5. *Attitudes of teachers.* It is a truism to say that the attitudes of teachers influence their students. But the nature of the influence is not so obvious. One influence that is particularly relevant is the extent to which the teachers understand the nature of talent, its distribution in the population, the social and class barriers to educational achievement, and the relations between educational motivation and family or social background. The preceding discussion indicates that there is frequently a substantial reserve of intellectual talent that fails of recognition because of the methods by which students are selected for higher levels, the age at which different streams are separated, and the failure to be on the alert for unrecognised ability. The teacher who is aware of these relationships will find more talent among his students and will be better able to encourage the development of latent talent than will the teacher who is blind to these relationships. The implication is clear that in the education of future teachers, the devotion of some attention to these aspects of educational sociology and educational psychology should help the teachers to become better able to identify, encourage, and develop the talents of their students.

6. *Nature of course content.* In most countries, it is becoming increasingly difficult to secure as many highly qualified teachers as are needed for the increasing numbers of students. There is, however, a means of at least partly overcoming the shortage of excellent teachers. It is to give all teachers the most excellent teaching materials that can be created. One of the potentially most useful of all of the current efforts to improve education is the systematic work being undertaken in several countries to improve the content of school courses in mathematics, physics, chemistry, and biology. Senior scientists have joined with school science teachers to revise, bring up to date, and make intellectually stimulating the courses offered in mathematics and the experimental sciences.

It is not possible, in view of comparative salary schedules and the other positions that are open to university graduates, to have as many excellent teachers of science and mathematics as would be desirable. But it is possible to put into the hands of the teachers who are available the very finest textbooks, supplementary readings, laboratory manuals, experimental equipment, and teaching aids that skilled scientists and well-qualified teachers can produce. This technique of drastically improving the content of science and mathematics courses is one of the most immediately effective procedures that can be followed in an effort to improve science education. The technique could be used in other fields as well.

7. *Scholarship provisions.* If a student is interested in education, if he has come through a school that has given him good preparation for more advanced work, there is still the problem of obtaining the higher education that is necessary for him to become a scientist, a technologist, or a member of one of the other professions. Sometimes his difficulty in securing this education is financial. Most countries make some provision for scholarships, bursarships, student loans, or the remission of fees. The amount of money available under these schemes and the policies that govern the awards vary greatly. In general, scholarships and other grants to students can serve three purposes:

- *a)* They may be used to democratise higher education by being awarded only to those students who could not otherwise afford to enter the university.
- *b)* They may be used to steer students into fields in which there is particular need, for example, science, engineering, or teaching.
- *c)* They may be used to motivate many students and to enhance the prestige of good scholarship.

Which of these uses should be emphasized in a particular nation depends upon its own problems. The educational authorities can arrange the conditions to emphasize one or another objective. Thus, if the purpose is to democratise education, awards will be made to students from the middle and lower social classes. If the purpose is to meet a need for men and women in a particular profession, the awards will be made to students who are preparing for that profession. If the objective is to motivate a large number of students, scholarships can be awarded upon the basis of competitive examinations, students are encouraged to take these examinations, and the winners are accorded public prestige and honor.

It is, of course, quite possible for a scholarship program to serve two, or all three, of these different purposes. The point to emphasize is that the educational authorities can select the purpose that scholarships and loans are intended to achieve, and then set the conditions that will best work toward that objective.

CONCLUSIONS

Several points stand out as conclusions to be considered by educational authorities interested in increasing a nation's supply of educated talent.

1. The extent to which potential ability will be developed depends largely upon social factors which, within limits, can be changed.

2. The actions to be given first emphasis in a program of educational development depend upon the state of economic, industrial, and educational development of the country.

3. The pool of available talent will be greater if the age of separation of students into academic and non-academic streams is later, e.g., 14 or 16, than if it is early, e.g., 10 or 11.

4. Students of potentially high ability should be identified early in their school careers even though they are not immediately separated into a special stream.

5. The pool of talent will be larger if a variety of measures of ability is used than if decision is based on general or average measures.

6. The nature and degree of excellence of the curriculum, the texts, and other teaching materials, the nature of the guidance system, and the nature of financial help available to students all do in fact influence the students' educational motivation and the fields of study of greatest interest. Since they do in fact exert this influence, they may be changed or controlled in the interest of national policy.

7. The effectiveness of policies adopted by the educational authorities to increase the supply of talent will depend to a considerable extent upon the knowledge that the teachers have of the nature and distribution of talent and the factors that influence its recognition and development. Attention to these

matters in the education of teachers will increase the flow of talent.

8. Finally, and most generally, the intellectual potential of a nation is not a fixed quantity. It is a variable. The nation itself, through its social and educational policies, can increase or can decrease its intellectual resources.

CHAPTER 3

REGIONAL INEQUALITIES IN EDUCATIONAL OPPORTUNITY

Jean FERREZ

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The fact that educational opportunity varies from one region to another so that a child's chance of getting the education he deserves is better or poorer, other things being equal, according to where he lives, is one of the proofs that untapped reserves of ability exist. A study of inequalities may help us to gain some idea of the size of these reserves.

For a country to make full use of its hidden talent it would first have to explore the human potential concerned, i.e. all the children of school age. Such systematic exploration is rarely undertaken after the primary stage of education and is only possible if education is planned on a regional basis and secondary schools are suitably distributed. Planning of this kind is already under way in France as part of the 4th Equipment Plan but to be effective a number of prior conditions must first be fulfilled in spheres as different as government policy (i.e. official decisions concerning the building and financing of new schools) and the functioning of statistical services (precise and detailed regional data on school attendance rates at various levels).

STATISTICAL RECORDING OF REGIONAL INEQUALITIES—THE KEY FACTORS

To study regional inequalities in educational opportunity we shall use the school attendance rate at a given level, i.e. the percentage of children who attain this level out of the total number of children of the same age-group(s).

In a country like France, which does not have the common school system and where children complete their primary education at the age of 11, with the possibility of entering one of the main streams of secondary education—classical, modern or technical—either until they take the baccalauréat at 18 or complete the short course at 15, the most characteristic attendance rates for our study are the proportion of children who leave the last form of the primary school ("cours moyen 2ème année") at roughly the age of 11 and enter the first form of the secondary school ("classe de 6ème").

The proportion entering secondary school T1 ("coefficient de passage en 6ème"), which gives us a measure of the utilisation of ability at the age of 11, was about 50 per cent in France in 1960; in other words out of a total of about 800,000 children, 400,000 go on to a secondary school where they come under the "cycle d'observation" during which their abilities are tested systematically with a view to guiding them—usually about two years later—towards a particular course of studies.[1]

This figure of 50 per cent shows immediately that in a highly educated country like France, one-half of the children never have their abilities tested systematically. Are the abilities of these "neglected" children less on the whole than those of the "observed"? Not at all—studies carried out by experts on educational and vocational guidance a few years ago showed that in fact there were just as many children capable of following a secondary school education among those who stayed in the primary schools as there were among those who went on to a secondary school.

The proportion entering secondary school (T1) does not, therefore, give a sufficiently accurate idea of the potentialities of the school population, since it measures only the extent to which ability is utilised at the very specific stage of admission to the secondary school.

We shall therefore also use the average secondary school attendance rate T2 ("coefficient moyen de scolarisation secondaire"). This is the ratio of the number of children receiving secondary education—whether the full course of general education (classical, modern or technical) or of vocational education or the short courses in these subjects—to the total number of children in the relevant age-group, i.e. in France all children between the ages of 11 and 17.

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[1] This percentage does not of course cover all the children attending school since schooling in France is compulsory until the age of 14, but only those who leave primary school to go on to a secondary school. It should be noted that the school leaving age is to be raised to 16 in 1967 and that 65 per cent of children already stay on at school after 14, 51 per cent after 15 and 42 per cent after 16.

If we look at the map of France (see Appendix I) on which the average secondary school attendance rate (T2) has been shaded in by "département", we see immediately that the areas situated south of a line drawn from La Rochelle to Besançon have higher rates than the areas to the north of that line—excluding of course the Paris area.

The reasons for this first difference are primarily historical; in early times, Roman civilisation spread through Provence and Aquitaine leaving behind a strong cultural tradition whose effects are still evident. An even stronger reason perhaps is to be found in the pattern of economic life in these southern regions. In the south-west, an exclusively vine-growing area which like the mountainous regions of the Southern Alps and the Massif Central, is subject to periodic crises, and where economic development is not very marked, parents try to give their children the best possible education so that they can leave the land for the town. In the industrial areas of the north, on the other hand, where labour is in great demand, and in the rich farming areas of the centre with their hierarchical social structure, there is less demand for education, since the children have natural and traditional occupations ready to hand.

Let us examine the attendance rate at "département" level in greater detail. Graphs 1 and 2 of Appendix II show the proportion entering secondary school in 1960 and the average "département" secondary school attendance rate in 1958. These are organ-pipe (histogram) Gaussian curves whose ordinates represent the number of "départements" with a given school attendance rate. These graphs give intermediate and precise data concerning variations in the rate. In both cases, the variations are considerable: two "départements" have average attendance rates of between 18 and 20 per cent, while another exceeds 70 per cent. Another interesting point is that the most frequent average attendance rate is around 35 per cent.[1]

Let us now look at the "départements" with the lowest attendance rates and those with the highest. Nine have an average school attendance rate (T2) of less than 25 per cent; in ascending order, these are:

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[1] In view of the spread of education in recent years it is obvious that the average school attendance rate (T2) calculated for the whole period of secondary education (11 to 17 years) in 1959 is below the proportion entering secondary school (T1) for 1960–1961, given previously; this accounts for the difference between 50 per cent and 35 per cent.

Loir-et-Cher	18.2	per cent
Mayenne	18.9	"
Vendée	22.2	"
Deux-Sèvres	23.2	"
Eure	24.3	"
Gers	24.7	"
Eure-et-Loir	24.8	"
Indre	24.9	"
Aube	24.9	"

Among those with the highest rates, nine "départements" have an average T2 rate of over 50 per cent; in descending order, these are:

Alpes-Maritimes	70.2	per cent (a special case)
Seine	61.4	"
Bouches-du-Rhône	55.8	"
Haute-Garonne	55.2	"
Seine-et-Oise	55.2	"
Hautes-Pyrénées	55.1	"
Var	54.9	"
Hérault	54.3	"
Savoie	50.1	"

Apart from Seine and Seine-et-Oise, i.e. the Paris area whose particular situation deserves a special study, all the "départements" with high rates are south of a line drawn from La Rochelle to Besançon. On the other hand, except for Gers, all the "départements" with low rates (less than 25 per cent) are north of this line.

Anyone who knows France well will see immediately that the low rates relate essentially to *agricultural* and *rural* "départements", in which agricultural workers account for a high proportion of the total working population. Thus, while the agricultural labour force, whether farm owners or wage-earners, averaged 27 per cent in 1954[1] for France as a whole, the "départements" with the lowest rates have the largest proportions in agriculture: 59 per cent for Mayenne, 57 per cent for

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[1] Statistics of the agricultural working population were taken from the 1954 census.

Vendée, 53 per cent for Deux-Sèvres, and 48 per cent for Loir-et-Cher.

The main point, however, seems to be not so much the activity of the population as its *dispersion*. Thus, some "départements" where farming is not the basic activity nonetheless have low rates solely because dwellings are widely dispersed. A typical case is the "département" of Eure-et-Loir which, with one of the lowest rates in France, has an agricultural population of only 40 per cent, the figure for the industrial labour force being 27 per cent. This dispersion of dwellings is reflected in the low population density in the "département"; the school attendance rate remains low because the schools are too far away for some of the children to get to them easily. In areas with a low rate therefore, the rural factor seems more decisive than the agricultural one. "Départements" with an attendance rate of less than 25 per cent all have a population density per sq. km. far below the national average of 80, as the following table shows:

Loir-et-Cher	37	Gers	30
Mayenne	48	Aube	40
Vendée	57	Eure-et-Loir	56
Deux-Sèvres	52	Indre	36
Eure	56		

Let us now turn to the "départements" with a high rate. They all have only a small proportion of the population engaged in agriculture: Seine, 0.3 per cent, Seine-et-Oise, 7 per cent, Bouches-du-Rhône, 8 per cent, Alpes-Maritimes, 13 per cent. But they all have something else in common—a *large town* with *extensive suburbs*, i.e. a densely populated urban area.[1] For the Seine, there is the Paris area, for the Alpes-Maritimes, there is Nice and for the Bouches-du-Rhône, Marseilles. It is mainly in thickly populated urban areas that high attendance rates are found and this would seem to suggest that population density is the most important factor.

To check this we shall take a more limited area than the "département", since in fact the average "département" attendance rates conceal major inequalities between the different areas of the "département", and if in the same "département" we

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[1] This is confirmed by the population density per sq. km.:

Seine	11,256	Bouches-du-Rhône	206
Seine-et-Oise	327	Alpes-Maritimes	130

compare the urban with the rural area we find even greater differences in attendance rates than those noted so far. In connection with the Education Plan we have divided each "département" into districts, each district grouping a whole number of "cantons" and as far as possible representing a social and economic unit. As the result of a survey we were able to determine systematically, for each district, the number of children who in 1958-1959 were in the top form of a primary school and in 1959-1960 were in the first form of a secondary school. In this way "true"[1] rates of secondary school intake were obtained for geographical units smaller than "départements" for which no detailed statistics[2] are normally available.

Let us take for example four "départements", two with low rates, Vendée and Somme, and two with high rates, Var and Haute-Garonne.

In Vendée the average proportion entering secondary school for the whole of the "département" is 27 per cent but in the area of the main town La Roche-sur-Yon, it is 35 per cent while in other districts it is as low as 15 per cent; the position is similar in the Somme where the average rate is 26 per cent, the rate for the urban area of Amiens (122,000 inhabitants) 30 per cent and that for the rural district of Fréville-Escarbotin only 12 per cent.

Among the "départements" with high rates we find similar variations; in the Var, where the average is 62 per cent, the urban area of Toulon-la-Seyne, with its 191,000 inhabitants has one of the highest rates in France with 74 per cent whereas that of Hyères, relatively more rural, is around 40 per cent; in Haute-Garonne, where the average rate is 50.5 per cent, the town of Toulouse sends 60 per cent of its children to secondary schools whereas only 1 in 5 goes to secondary schools in the Auterive district (roughly 20 per cent).

Following this survey of school attendance in the different "départements" and within one and the same "département" we reach the conclusion that the *rural factor* is the most important factor and the one which seems most decisive in determining whether children continue their education. In rural areas dispersion of dwellings not only compels children who wish to attend a secondary school to become boarders, but also leads to one-class primary schools in which instruction is less effective than in those with several classes. The level reached by children at the age of 11 in schools having only one class is usually lower than that attained in other schools. A further point to be noted is that in these areas the *social factor* tends to heighten the effect of the rural factor as the farming population is usually rather poor and its social status very modest.

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[1] These rates are "true" because the first form pupils have been related to their district of residence and not to the school they attend.

[2] This means a great deal of work, but is absolutely essential if education is to be planned on a geographical basis, since it provides an exact picture of school attendance in geographical areas small enough to be reasonably uniform.

The importance of the social factor scarcely comes within the scope of this paper, but I may perhaps be allowed to give an example. Among the "départements" with the lowest rates, Pas-de-Calais has an average attendance rate of 26 per cent. However, this "département" is neither agricultural nor is its population dispersed: population density per sq.km. is in fact 195, one of the highest in France. It is a coal miners area and 50 per cent of the working population is engaged in industry. Here then is a non-rural "département", densely populated and yet with low school attendance; this is a special case which brings home the importance of social environment for educational opportunity.

In determining attendance rates, we have until now treated the various types of secondary education as though they were comparable. But in fact they are not. The education given in the old "cours complémentaires" or in the apprentice centres (which offer short courses normally ending at 15 or 16) and the education given in the more important schools such as "lycées" and "lycées techniques" (at which pupils usually stay until they are 18 or 19, when they take the "baccalauréat" and can go on to higher education), can hardly be said to offer pupils equal opportunities. What happens, however, in the rural areas is that children who can go on to a secondary school are nearly always offered and have to take a short course, which makes the low rates of secondary school attendance in these areas even more serious.

In order to see how the differences between the various forms of secondary education may influence future opportunities, we shall now consider the question of access to higher education with the help of statistics giving the geographical distribution of French university students at 30th June, 1959.

These statistics show the proportion of young people of

19 to 24 in each "département" who were receiving a higher education. The rate T3 obtained was 48 per 1,000 for France as a whole; this figure may seem low but it should be noted that it refers solely to higher education given at university level to pupils having passed their "baccalauréat" compared with the potential student population (19 to 24 age-group). This comparison is valid only on the assumption that all students do five years' study, which is more than the average.[1]

The result of this study (graph 3 of Appendix II), plotted as a Gaussian curve of the type used previously, shows that higher education attendance rates vary over the whole of France from 20 per 1,000 to 100 per 1,000, the most frequent distribution being between 30 and 40 per 1,000.

Let us now pick out the "départements" with the lowest rates and those with the highest (Cf. table 1 of Appendix II). Among the former is the "département" of Mayenne (20 per 1,000), which, as we have already noted, has one of the lowest rates for secondary education, and Morbihan (19 per 1,000); both "départements" are for the most part agricultural and rural.

Among those with the highest rates, we again find the "département" of the Seine with 101 per 1,000, Hérault with 99 per 1,000, Bouches-du-Rhône with 95 per 1,000, and Haute-Garonne with 87 per 1,000. The amplitude of the variations in the secondary school attendance rate—from 19 per cent for Mayenne to 61 per cent for the Seine—showed that the latter had a rate three times higher than the former. At the point of entry to higher education, the difference is even more marked, since the ratio of the two extremes is now 1 to 5 : 20 per 1,000 for Mayenne, 101 per 1,000 for Seine.

To conclude this commentary on regional inequalities in educational opportunity, I would like to quote some figures to show how social and geographical factors can combine at the level of higher education to make these inequalities even more striking. The figures refer to the social background of students not in relation to their number but in relation to the social and professional category to which the father belongs. The result is really startling: the number of students who are sons of farmers or farm workers represents 2 per 1,000 of the agricultural population, the number of industrial workers' sons 0.8 per

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[1] The rate T3, like T1 and T2, is significant only as a relative value; to compare it in absolute terms with rates in other countries, one would first have to know how all the various rates are determined.

1,000 of the industrial worker population, the number of children of the liberal professions, civil servants, etc., 80 per 1,000. This means that the chances of children from the latter social class of getting to university are 100 times better than those of industrial workers' sons and about 50 times better than those of farmers' or farm workers' sons.

We have measured in various ways the importance of geographical factors in a child's chance of receiving secondary school or higher education; we have seen that these factors are even more important than the social ones; and that the effects of these two kinds of factors are particularly decisive when combined, i.e. in rural areas. Basically, therefore, the distance between a child's home and the nearest secondary school is still the most important factor, since parents are reluctant to send young children to distant schools when there are no daily transport facilities. A further point is that if there is a secondary school close at hand parents obviously send their children to it simply because it is near, without bothering too much about the child's abilities or whether the education offered is suitable.

The conclusion is not difficult to draw. Untapped reserves of ability exist on a very large scale. This is clear from the figures for secondary school intake, which vary according to area from 12 to 74 per cent. But if we are to mobilise these reserves to meet the demands of the modern economy and to give every child the best opportunity, we must systematically search out all available talent—something which at present is done most unevenly from one region to the next. This is one of the things we are currently trying to do in France as part of our recent educational reform.

REFORM AND REGIONAL PLANNING OF EDUCATION IN FRANCE

The educational reform now being carried out in France became law in 1959. Its main purpose is to provide the large post-war generations with the kind of intellectual and technical education which will help them to find their place in the rapidly evolving economy of a modern country.

As a result, France should have no difficulty in moving towards a situation where the proportion of the working population represented by the tertiary sector, which in 1954 was only 36 per cent, will increase rapidly to reach more than 60 per cent towards 1975.

I will not go into the detail of this reform, but will confine myself to its major provisions. These are:

1. *Raising the school-leaving age to 16 years.* This measure, which will not be fully effective until 1967, is in practice simply the confirmation of a spontaneous development, since 65 per cent of the 14 year olds are at present already attending school; the new measure will ensure that the remaining 35 per cent do so too.

2. *A compulsory 2 year observation cycle* (in the first and second forms of the secondary schools, i.e. usually at age 11 and 12). During this period of observation, pupils are offered a choice, according to their abilities, between the modern and the classical stream. Timetables and curricula, which until now have differed according to the kind of instruction given in the school in question (the long or short course, or even the technical one) will henceforth be unified or virtually so. The idea is that every child capable of profiting from a particular kind of education should do so and that guidance which is often merely fortuitous or prejudiced should give way to guidance based on thorough observation of the child's abilities. The principles which underlie this period of observation are as follows.

   a) The abilities of the younger generation should be explored as thoroughly as possible.
   b) Children whose talent is confirmed during this period of observation should be enabled to follow their particular bent without further delay (e.g. possibility of taking Latin as a main subject after the first term).
   c) To help other pupils, i.e. the majority, whose abilities are not clear or have still to take shape by keeping them under compulsory observation so that their families may be informed of any obvious shortcomings, or any re-orientation that may be necessary.

3. *Systematic guidance at the end of the period of observation.* Pupils are advised to follow the general course of secondary education, a technical course, or a course ending at the school-leaving age. This guidance is given after a recommendation has been made to the family by a Guidance Board consisting of the entire teaching staff, an educational psychologist or a vocational and educational guidance adviser; this recommendation is not binding and parents are not obliged to enrol

their child in the school recommended. If they do, however, the child is admitted automatically, while if they choose a different type of education, the child will have to pass an entrance examination.

4. *Continuous guidance* whereby pupils can be switched from the general to the technical stream, or vice versa, by means of a "remove" at the level of the 4th and 3rd forms (13 to 15 years old).

There is no doubt that all these measures will help to spread education and improve opportunities. Let us consider how some of them will help to do away with, or at least reduce the regional inequalities described in the first part of this paper.

As we have seen, it is usually the distance between the home and the school which determines educational opportunity, and this explains why the period of observation and, generally speaking, the provision of secondary schools, will be based on the following three principles:

— dispersion of schools,
— school transport,
— comprehensive schools.

The period of observation, if it is to cover the maximum number of children, must be as widely spread as possible. But where should the limit be set? The idea is to offer a choice between classical and modern studies. In addition, to allow for the children who stay two years in the last form of the primary school ("cours moyen 2ème année") and who have not completely mastered all the basic requirements for secondary school entrance, a third section (for less advanced pupils) should be provided. In principle, therefore, the observation cycle will include at least three streams at first form level and three at second form level. This would mean an "elementary" observation group of 100-150 pupils, thus determining the extent to which schools can be dispersed. To bring such a group of pupils together will usually mean covering an area of 5,000 inhabitants. Consequently, apart from mountainous areas, the observation group will be located in a district whose population is not less than this figure.

In some districts, this may mean that pupils have to travel up to 15 kilometres to get to school. The dispersion limit compatible with reasonable efficiency has, therefore, led the Ministry of National Education to consider systematic arrangements for transporting children to and from school. Such transportation can also be used—in areas where the population density warrants it—for children attending secondary schools at a more advanced level. So that the cost should not discourage school attendance, it has been decided that transportation will as far as possible be free. The financial aspect has still to be settled in detail, but much transport is already in operation. In view, however, of the large contribution made by the state (more than 50 per cent) and the local authorities, which are taking a growing interest in educational problems, free travel will usually be the rule.

Finance is not the only problem connected with transportation, since children who go to the cantonal school will have to take their midday meal there. Arrangements are therefore being made to provide canteens, and in many cases there will also be a period of evening study so that pupils can do their preparation at school with fresher minds than they would have after their journey home.

If, at the end of the observation cycle, it should happen, as it still frequently does in France, that the school attended by the pupil offers only one stream, it is obvious—and this is borne out by statistics—that whatever the child's abilities, it is tempting to both parents and teachers to persuade him to follow the stream available on the spot. To prevent such cases, which lead to guidance of the wrong kind, and whose effect is particularly bad in rural areas where very often only the short course is offered,[1] the educational reform provides that as far as possible schools will be comprehensive.

Under the plans now being carried out which will entail the building of a large number of new schools, the Ministry has issued directives that at the various stages of guidance,[2] children should either be sent to another school or be offered several choices on the spot.

This principle is, of course, incompatible with the existence of monolithic schools which provide a complete course in secondary education from start to finish. However, we feel that it is particularly important that it should be respected. This will entail a complete structural reform of schools and their teaching staff, but it is one that has to come. The pattern of schooling may thus vary locally, but by and large it will be as follows: at the lowest level, a two-year observation cycle; then a first comprehensive cycle offering classical, modern and technical (long and short) education, and a course for those who will leave after completing compulsory schooling; lastly, moving up the scale, schools of the second cycle providing long courses in classical, modern, technical and vocational education, leading up to the "baccalauréat" or to the degree of "technicien" and "technicien supérieur".

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[1] See first part of this chapter, page 75.

[2] In secondary school education, these stages correspond to the end of the observation period and entry into the second cycle.

AGE	FORM	LONG COURSE		SHORT COURSE	
17 years	Terminal	2nd cycle	Classical, modern, technical, vocational education		
16 years	1st				Vocational education
15 years	2nd			General education	
14 years	3rd	1st cycle			
13 years	4th				
12 years	5th	Observation cycle			
11 years	6th	Classical, modern and technical education			

These are the principles now being applied in elaborating the "school map", i.e. in determining the location and structure of the schools, the building of which is necessitated by the increase in population and by the educational reform itself. They call for a complete overhaul of the present school system, which in view of the total cost involved, could only be envisaged under the pressure of events, such as the wave of post-war children now reaching the secondary schools. The reform therefore took place just in time; the funds required to build the new schools needed to reshape the educational system would not have been granted in the stable conditions which would soon have returned had there been no reform. It was absolutely vital to profit from this explosive increase in population and the exceptional grants it necessitated to completely re-make the educational map. This is the purpose of the systematic planning currently under way to decide where the new schools should be built.

I have no wish to go into the details of regional planning, which like any other form of planning requires a precise knowledge of the present situation, and a clear idea of the objectives in view; I would, however, like to say a word or two about its complexity, its various phases, and the statistical and administrative work it entails.

First of all, planning presupposes an exact knowledge of the demographic trend and, in particular, school statistics for geographical units small enough to encompass an observation cycle. For this purpose each "département" has been divided into districts containing a certain number of "cantons" for which statistics are available; these statistics include distribution of children by age-groups, the presumed trend of this distribution and accommodation available in existing schools.

The target has been set for 1970 in the light of the work done by the Commissariat au Plan and the Commission de la main d'œuvre,[1] which postulates that by 1970 France will have an educational structure capable of meeting the estimated demands of the economy in 1975. This forecasting work proved particularly difficult, but once completed it was possible to determine what would be the desirable distribution in 1970 of school children aged 13 to 14 between the long general and technical courses, the short general and technical courses, agricultural training and industrial apprenticeship schemes (see Appendix III—Table 1).

Having set this target, the authorities must decide on the type of schools needed and the size of the population in their normal recruiting area, a distinction being made between urban areas and rural areas. This work has led to the results which you will find in Table 2 of Appendix III, showing the normal size of the schools and the average population of their recruiting area.

Finally, "département" and academic commissions, including teachers, representatives of various professions, agricultural and planning services, etc. have, on the basis of these directives, worked out an ideal location of schools. Their proposals are now being studied at national level, priority being given to secondary schools in areas with low attendance rates.

It may be wondered whether launching a programme of this kind is not tempting fortune to some extent—as if it was not already difficult enough to provide education for all the children born after the war and to cope with the naturally growing demand for education. The action taken does tend to accelerate matters and to exacerbate problems which are not only financial but also involve the French economy's capacity to build more schools and to recruit more teachers.

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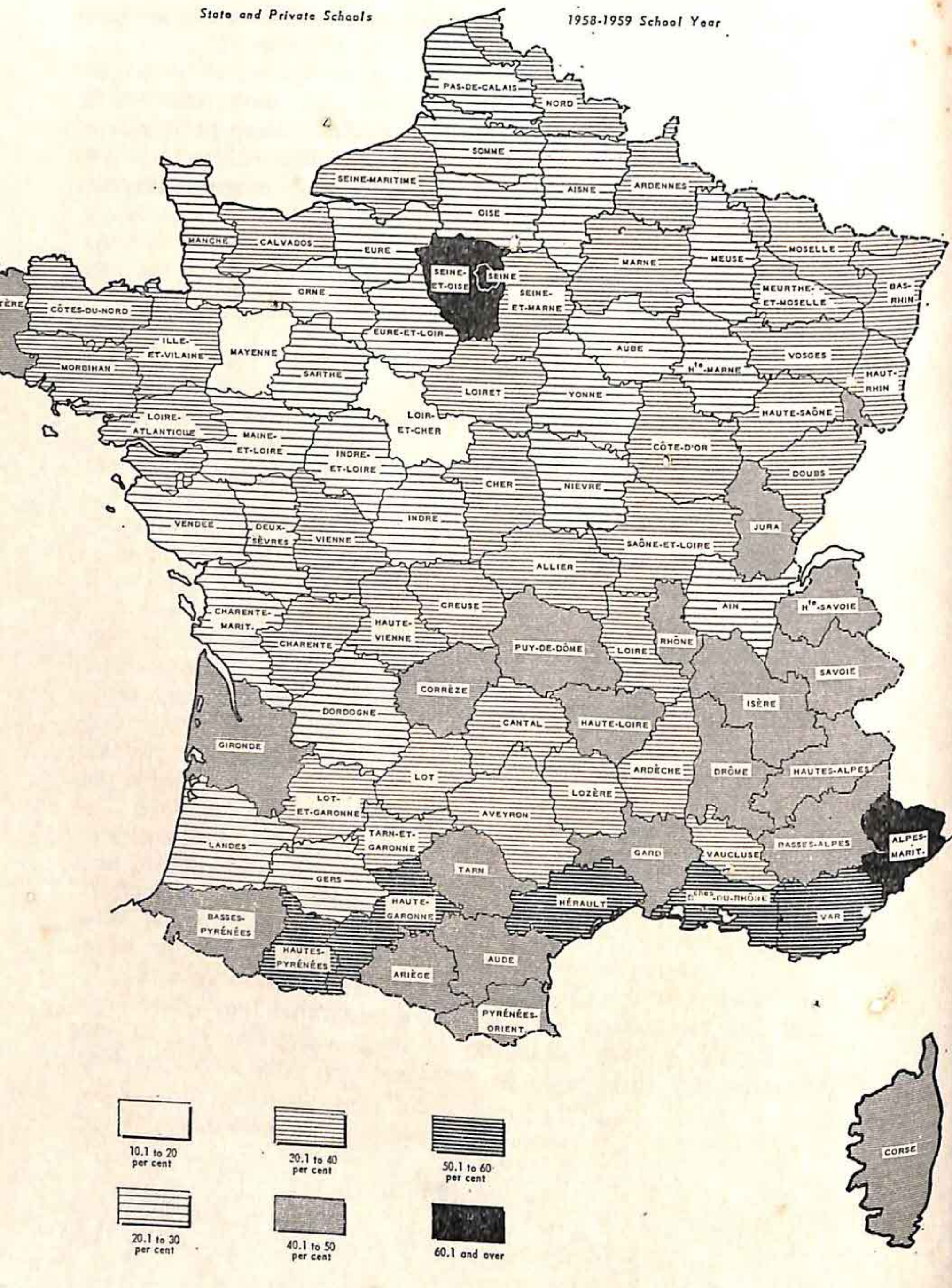
[1] Under the chairmanship of M. Fourastié.

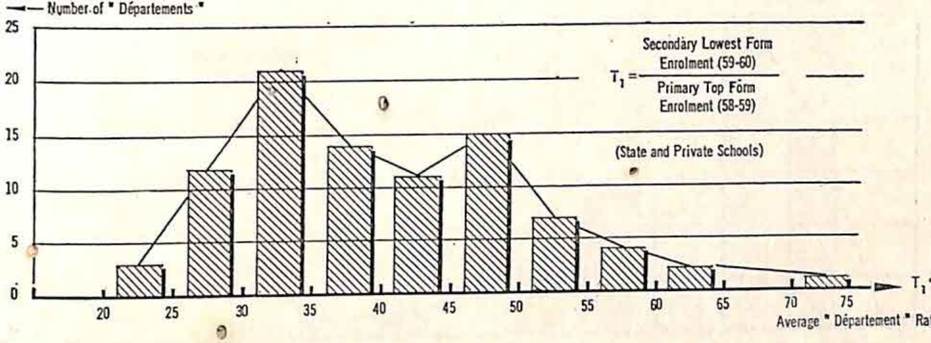
The subjects dealt with in this paper deserve to be treated at much greater length. But the paper will have achieved its purpose if it has thrown some light on the guiding principles of systematic educational planning, the difficulties of the task, and the imperative duty to pursue it, if the large, untapped reserves of ability are to be developed to the full.

RATIOS OF SECONDARY SCHOOL POPULATION TO THE 11 TO 17 AGE GROUP BY "DEPARTEMENT"

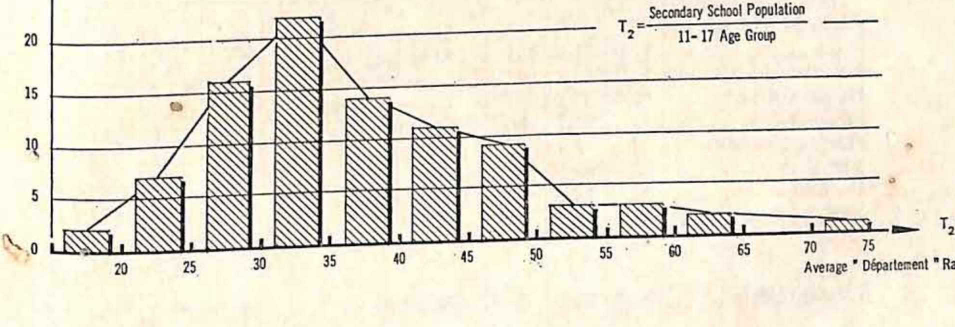


Appendix II to Chapter 3

Graph 1. AVERAGE PROPORTIONS ENTERING SECONDARY SCHOOLS IN 1959–60 BY "DEPARTEMENT"



Graph 2. AVERAGE SECONDARY SCHOOL ATTENDANCE RATE IN 1958–59 BY "DEPARTEMENT"



Graph 3. AVERAGE HIGHER EDUCATION ATTENDANCE RATE IN 1958–59 BY "DEPARTEMENT"

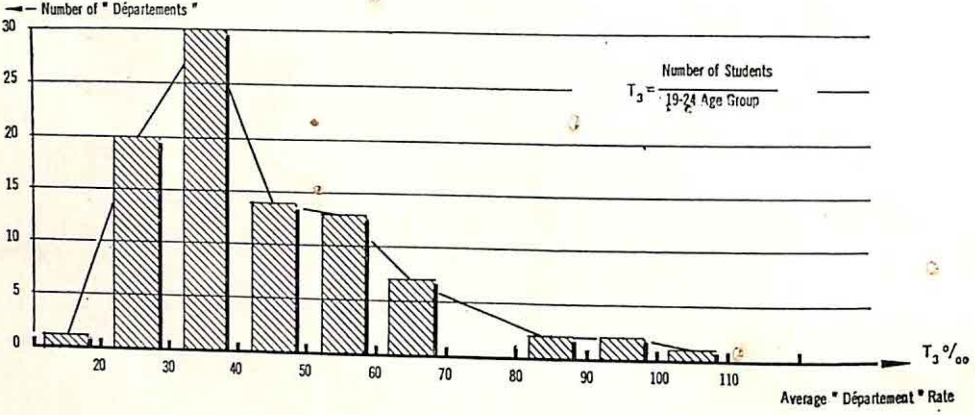


TABLE I. SELECTED ATTENDANCE RATES

"Départements"	T1	T2	T3	"Départements"	T1	T2	T3
Alpes-Maritimes ..	52.7	70.2	81	Loir-et-Cher	23.1	18.2	28
Seine	72.6	61.4	101	Mayenne	22	18.9	20
Bouches-du-Rhône	51.7	55.8	95	Vendée	27.5	22.2	22
Haute-Garonne ...	50.5	55.2	87	Deux-Sèvres	28.7	23.2	32
Seine-et-Oise	48	55.2	60	Somme	26.2	24.1	28
Hautes-Pyrénées ..	53.4	55.1	47	Eure............	29·1	24.3	28
Var	62.3	54.9	63	Gers............	28.1	24.7	40
Hérault	59.1	54.3	99	Eure-et-Loir	33.5	24.8	28
Savoie	46.3	50.1	50	Indre	31.9	24.9	29
				Aube	36.3	24.9	25
Pas-de-Calais	34.7	26.0	26	Morbihan	41.1	32.6	19
National Average .	41.8	43.1	48				

Appendix III to Chapter 3

TABLE I. DISTRIBUTION OF PUPILS IN THE 4TH FORM (CHILDREN AGED 13 TO 14) IN 1970 BY TYPE OF EDUCATION

TYPE OF EDUCATION	1970		OBSERVATIONS
	NUMBERS ENROLLED	PERCENTAGE	
Long general course	170,000	22	2 % take the long technical course when entering the 2nd form
Long technical course	65,000	8	This percentage becomes 15 at the point of entry into the 2nd form
Short general course	140,000	18	5 % take the long technical course when entering the 2nd form
Short technical course	235,000	30	Subtotal: 415,000 (52 %) of which 160,000 (20 %) do the full course
Industrial apprenticeships (1970)	60,000	7	
Agricultural training at all levels (1970)	120,000	15	
	790,000	100	

TABLE II. NORMAL SIZE OF SCHOOLS AND AVERAGE POPULATION OF RECRUITING AREAS BY TYPE OF SCHOOL

TYPE OF SCHOOL	SIZE OF SCHOOL		RECRUITING AREA AVERAGE POPULATION	
	MINIMUM	MAXIMUM	URBAN DISTRICT	RURAL DISTRICT
Classical and modern "lycée"*[1]	550	1,600	35,000	45,000
1st cycle of "lycée" [2]	200	400	1,200	1,600
Industrial and technical "lycée"[2]	400	1,000	160,000	220,000
Commercial and technical "lycée" [2]	400	1,000	80,000	110,000
"Collège"* providing a general course[2]	200	500	12,000	16,000
"Collège" providing technical and industrial courses[2]	200	600	50,000	65,000
Observation group	100–150	450	5,000	5,000

* "Lycées" and "Collèges" provide the same education with identical curricula and timetables. The "lycée" is founded and maintained by the state, the "collège" by the "commune", i.e. the local authorities.

1. Including observation cycle.
2. Excluding observation cycle.

CHAPTER 4

SOCIAL CLASS FACTORS IN EDUCATIONAL ACHIEVEMENT

Jean FLOUD

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SOCIAL CLASS FACTORS IN EDUCATIONAL ACHIEVEMENT

Jean FLOUD

The problem facing us in this Conference may be put thus: given that in a modern economy the quality and efficiency of the working population very largely depend on the educational system, how can we secure a qualified, fluid and economically distributed labour force?[1] The skill of labour at various levels reflects the nature, scale and organisation of educational provision, which also exercises a decisive influence on vocational choice and movement. How should we envisage the contribution of the educational system to the task of adjusting the supply and the demand for trained labour?

We are fortunate in not having to treat the whole of this complex problem in our discussion. Thus, we are not to concern ourselves with the thorny economic problem of the desirable level of investment in education at a given stage of economic growth. We may accept the broad proposition that industrialisation involves a progressively larger allocation of resources to education, and confine ourselves to the social and educational aspects of the problem of making the best use of human resources in a modern economy.

I

The structure and dynamics of the national labour market are notoriously difficult to determine. The educational system must serve broadly defined long-term needs of the economy:

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[1] For a more extended version of the discussion which follows, see Jean Floud and A. H. Halsey, "English Secondary Schools and the Supply of Labour", *Year Book of Education, 1956*.

thus, literacy must be spread or technical education developed. It must also cope with more precisely defined short-term requirements; increased provision for teacher training or expanded medical schools, for example.

In both the long and the short run, however, the economic and demographic factors involved in forecasting the supply and the demand of new entrants to industry are exceedingly complex and the adjustment can never be precise. The approach which seeks to forecast demand and then stimulate the educational system to meet it is intrinsically clumsy. Forecasting manpower requirements is difficult and hazardous under conditions in which technical innovation continually modifies the utilisation of manpower in production. Moreover, the fruits of educational reform are slow to mature. It has been calculated that in England and Wales in 1924 not more than 40 per cent of the occupied male population are likely to have had any experience in their school years of the educational improvements which followed the Education Act of 1902; by 1938 the proportion may have risen to 80 per cent. So far as concerns the 1918 Education Act, the proportion of those who had experienced its effects was estimated at 40 per cent in 1938 and it has probably only just, in 1960, worked itself out fully.

It seems, then, that, except for short-run and precisely definable problems of demand, the only satisfactory definition of the task of the educational system in relation to the labour market is in general structural rather than quantitative terms. It is not possible, generally speaking, to equate through education the abilities of individuals with the intellectual requirements of occupations; and no economic system can be so organised as to allow everyone to use his full talents in his employment. The best that can be done is to eliminate rigidities in supply[1] and leave talent to find its own level.

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[1] There are of course numerous other sources of rigidity unrelated to education and not all equally amenable to policy. The most useful general index of the extent to which the supply of labour is fluid is some measure of the propensity of children to enter and remain in occupations of the same or similar grade as those of their fathers. If all new entrants to the labour market were potential candidates for all posts there would be no rigidity of supply (although there might be a scarcity of individuals with particular potentialities) but the hereditary element in ability and the different intellectual requirements of different grades of occupation introduce a basic rigidity. Other rigidities derive from the nature of the demographic and occupational structures themselves. Thus, for example, the proportion of skilled to unskilled workers

The aptitudes and abilities of individuals are rarely specific, so that as long as there is equality of educational opportunity and freedom of vocational choice and of movement between occupations, they may be expected to find their way into positions which will stretch their capacities and enable them to make their maximum contribution to the needs of society. It is true that freedom of movement is one thing and getting the right person into the right place another; but the former is a precondition of the latter. The best contribution that the educational system can make to the economic problem is to send forward recruits to the labour force, potentially mobile, with or without further education as may be necessary, within the widest possible range of occupations, whether by guidance, direction, or merely in response to the prevailing pattern of economic incentive.

To state the problem thus abstractly is to understate the difficulties. It is safe to say that the greater the degree of industrialisation, the more are young people limited in their choice of employment by their educational attainments and the more difficult is it for adults to move outside the range of occupations for which their formal educational attainments equip them. Quite apart, therefore, from the primary difficulty of ensuring that ability translates itself into the appropriate educational achievement, it is important to devise educational arrangements which will not gratuitously reinforce this endemic tendency to rigidity in the supply of labour in a modern economy.

II

We may begin with the fundamental problem, which we may express in this way: how may differences in educational performance be reduced to differences of natural endowment? Some pupils will always do better than others, but it is desirable that the order of inequality should be, as it were, a natural one, unmarred by factitious and irrelevant social differences. No matter that such an objective is "only an ideal" and must in practice remain for ever unattainable; the important thing is that it should guide policy and that we should actively seek to approach it.

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in the population and the differential fertility of the various occupational groups define the opportunities for the sons of unskilled workers to enter skilled occupations. The localisation of industry and consequent regional differences in occupational structure, and the tendency of labour, especially juvenile labour, to be immobile are also relevant.

In all modern western societies, the phenomenon of *social class* is a prime source of, so to speak, "unnatural" inequalities in education; that is to say, of inequalities which do not rest on differences of endowment.[1] It is the purpose of this paper to explore the manifold ways in which it makes its obstructive influence felt, and to suggest practical measures for the consideration of policy-makers and administrators who, because they believe in the natural right of individuals to education, or because they want "talent" to find its own level in the labour market, are anxious to bring ability, educational opportunity and performance into something like perfect relationship.

Social class interferes with this relationship in a number of ways: at any given level of ability, it is both cause and consequence of inequalities of educational opportunity, in the sense of unequal chances of access to educational institutions or facilities; or, again at a given level of ability, it may influence the volume and direction of pupils' energies and, hence, their educational output; or, finally and more radically, it may affect the very structure of ability itself. It follows that it is susceptible of investigation and amenable to policy in very varying degrees. Until 1945, roughly speaking, the problem of social class in education was seen, by social investigators and policy makers alike, primarily as a *barrier to opportunity*. The problem was an institutional one: how to secure equality of access for children of comparable ability, regardless of their social origins, to institutions of secondary and higher education designed for, and still used in the main by, the offspring of the superior social classes. In so far as social class was seen to influence educational *performance* the problem was conceived of as a material one: how to mitigate the handicaps of poverty, malnutrition and overcrowding by using the schools as social agencies—by distributing free milk and meals to necessitous children and developing the school medical services. Only in the post-war period has the continuing attempt to democratise secondary and higher education in unfamiliar conditions of full employment and widespread prosperity confronted us with the need to formulate the problem more subtly and to see social class as a profound influence on the *educability* of children.

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[1] Other important sources of such inequalities readily suggest themselves: e.g. sex, geographical locality, ethnic or religious affiliation. To the extent that they are related to the more complex phenomenon of social class they are touched upon in this paper: some of the others are dealt with elsewhere in the conference.

Here we are not concerned with snobbery in education—with invidious social differences in school or overt social bias in selection procedures—but with the existence of fundamental differences as between the social classes in ways of life, values, attitudes and aspirations, as well as in material circumstances. So far as education is concerned, these class differences, which reflect a social distribution of probabilities in the life experiences of children of different social origins, can be translated as probabilities that they will respond differently to school, even at the same level of measured intelligence. The important thing to know is, first, what are the probabilities of response to schooling as we now organise it or offer it, and second, within what limits can we change or redistribute these probabilities given defined social, political or economic aims and certain resources. I will try to elucidate these points and illustrate them as well as I can, in the main from British experience.

SOCIAL CLASS AND EDUCATIONAL OPPORTUNITY

The educational systems of most European countries have grown up in the image of out-moded social class systems. That is to say, they reflect a stage of economic and social development in which education was a corollary, rather than a determinant, of social class position. Various types of independent and publicly-maintained schools have grown up to serve the different social classes and have developed distinctive and restrictive relations with the universities and with the occupational structure. These relations have been modified by the democratising tendencies of recent years. Both in France and in England, for example, the social composition of the traditionally middle-class grammar-type secondary schools has been transformed since 1945.[1] In both countries the way has been opened up for working-class children into the universities and the liberal professions, as well as into the higher ranks of industry and commerce; the social role of the secondary schools as agents of interchange between the classes (social mobility) has become of considerable importance.

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[1] See Christiane Peyre, "L'Origine sociale des élèves de l'enseignement secondaire en France", pages 6–34 in *Ecole et Société*, ed. Pierre Naville, Paris, 1959; Jean Floud, A. H. Halsey, and F. M. Martin, *Social Class and Educational Opportunity*, London, 1956.

But in neither country was the school system designed for the purpose of selecting and promoting talent; and there are a number of difficulties in adapting its aims and organisation to the new task of occupational and social selection thrust upon it by the twin pressures of national economic need and parental anxieties on behalf of their children's future in the labour market. There is no parity of industrial or social status among secondary schools of different types. Only a minority of schools in either country retains pupils for advanced work to the age of eighteen or over, and has a direct connection with the universities and other institutions of full-time further education. These are selective schools, either because they charge fees, or because public provision of this type of schooling is limited and places must be competed for, and are awarded to the most able candidates.

The selective schools are the prime source of recruits for all non-manual occupations and they have a virtual monopoly of entry to the high-ranking professional and managerial occupations. That the supply of trained talent should thus be, to all intents and purposes, dependent on separately organised schools of high social and educational status, catering for a selected minority of able pupils, in itself makes for rigidity.

For historical reasons the provision of selective school places varies considerably as between localities and these differences are associated with differences in the social composition of local populations.[1] Broadly speaking, the higher the proportion of non-manual workers in the local population, the larger the proportion of the 11-year old age group admitted to grammar schools. The relationship of the provision of places to the distribution of ability is loose to the point of arbitrariness. Age groups of children at the 11-plus in different localities may show similar proportions with I.Q.'s of 130+ but marked discrepancies in the proportions admitted to grammar school. Since these discrepancies are related to the social composition of the age group the effect is to make inequality of opportunity cumulative, with the bizarre result that the less rigorous the selection (the larger the proportion admitted to grammar schools) the greater the rate of success (the larger the proportion of those admitted staying at school for advanced work and proceeding to universities).

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[1] In England the provision ranges from 10 per cent to 50 per cent of the age-group; a comparable degree of geographical inequality is illustrated for France with the aid of a more complex index by Christiane Peyre, *op. cit.*

The very need to select for entry to secondary schools organised separately makes for rigidity. The supply of places in the selective secondary schools is bound to be relatively inelastic, and quite apart from short-run and localised changes in demand brought about, for instance, by migration, the task of keeping pace with long-term demographic fluctuations is a very formidable one. The result is that relative "class chances" of access to selective schools and the universities to which they lead are not easily equalised or even greatly improved in relation to each other.

In France, a leap in the numbers of working-class children entering the secondary schools, which resulted in the quadrupling of their proportionate strength in the annual entry between 1936-7 and 1943-4, has been followed by a relative slackening in their contribution, which after 1946 remained stable at about 12 per cent in face of a greatly increased total intake to the schools.[1] Data for England and Wales are fuller than for France, and the difficulties better illustrated from the experience of attempts over half a century to democratise the traditionally selective system of secondary and higher education. That the social composition of the secondary grammar schools has been severely modified by the progressive opening of all places to competition, can be seen from the following rough comparison of the occupations followed by the fathers of boys entering them before and after the Second World War.

TABLE I. SOCIAL ORIGINS OF BOYS ENTERING SECONDARY GRAMMAR SCHOOLS BEFORE AND AFTER 1944. ENGLAND AND WALES

In percentage.

OCCUPATIONS OF FATHERS	1930–1941	1946–1951
Professional and managerial	40	26
Clerical and other non-manual	20	18
Manual	40	56

Source: Pre-war figures from D. V. Glass (ed.) *Social Mobility in Britain*, London, Kegan Paul, 1954, Table VII p. 129. Post-war figures from 15–18 ("The Crowther Report") Vol. II, H.M.S.O. 1960, Table X, p. 130.

Comparable information is not available for the universities, but the changes there too have been marked, although on a smaller scale.

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[1] See Christiane Peyre, *op. cit.*

However, although the proportion of grammar school pupils and of university students coming from working-class homes has grown considerably, the percentage of all children at this social level who pass into the grammar schools and universities remains small; and changes in the relative "class-chances" for admission

TABLE II. CHANGES IN THE SOCIAL DISTRIBUTION OF EDUCATIONAL OPPORTUNITY

SECONDARY AND UNIVERSITY EDUCATION OF BOYS REACHING THE AGE OF ELEVEN BEFORE AND AFTER THE SECOND WORLD WAR, IN ENGLAND AND WALES

BOYS REACHING THE AGE OF ELEVEN	COLUMN 1 WORKING-CLASS[1]		COLUMN 2 OTHER[2]		COLUMN 3 ALL	
	PERCENTAGE ATTENDING					
	INDEPENDENT EFFICIENT OR GRAMMAR[3]	UNIVERSITY	INDEPENDENT EFFICIENT OR GRAMMAR[3]	UNIVERSITY	INDEPENDENT EFFICIENT OR GRAMMAR[3]	UNIVERSITY
1931–40	9.8	1.7	38.9	8.5	14.7	3.7
1946–51	14.5	1.6[4]	48.5	19.2[4]	23.0	5.6[5]

Source: Figures for national samples of boys reaching the age of eleven, 1931–40, derived from D. V. Glass, (ed.) *op. cit.* Tables 1 & 2, pp. 18–19; those for the 1946–51 group from 15–18 ("The Crowther Report") *op. cit.*; Tables 3a & 9, pp. 122 & 130 respectively. I am indebted to my colleague, Simon Pratt (Ford Unit for Research in the Economics and Administration of Education, University of London Institute of Education) for the corrected percentages of those attending universities.

1. i.e. Sons of fathers following manual occupations, whether skilled, semi- or unskilled.
2. i.e. Sons of fathers following non-manual occupations, whether professional, managerial or other 'white-collar'.
3. Independent secondary grammar schools (both private proprietary and "public" endowed schools) inspected by the Ministry and certified "efficient".
4. The class distributions in Columns 1 and 2 are based on the findings of the National Service survey reported by the Crowther Committee (15–18, Vol. II, H.M.S.O., 1960, Table 3a, p. 121). The chances of working-class boys are probably over-estimated and those of other boys under-estimated in the figures given there, owing to differences of practice as between independent and other schools with regard to deferment of military service. The Report states (p. 109) "Deferment operated heavily throughout all types of school other than the independent efficient schools." The figures in Columns 1 and 2 have been arbitrarily corrected to reduce the error from this source.
5. The overall chance of a boy going to a university is calculated as the number of men of all ages entering universities in the given years, divided by the size of the age-group most likely to correspond—i.e. an average of those reaching the age of 18–20 in those years. Students commencing first diploma courses (about 4.5 per cent of all students) have been excluded. But the figure of 5.6 per cent overall is nevertheless likely to be on the high side, since no account could be taken of the 10 per cent of all students in England and Wales who are recorded in the reports of the University Grants Committee, without distinction of sex, as living outside the United Kingdom. England and Wales are more likely to have a net import than export of men students. However, it is likely that any error is proportionally reflected in the figures in Columns 1 and 2.

to these institutions have been much less striking than might appear from the changes that have taken place in their social composition. The figures in Table II illustrate these points.

The post-war increase by 50 per cent in the proportionate attendance at selective secondary schools and universities is shown in Column 3. From Columns 1 and 2, however, it appears that while the proportion of the relevant age-cohorts of working-class boys passing into the grammar schools has increased by 50 per cent since the war, the figure is still very low—rather less than one in six as compared with nearly one in two of children from non-manual homes. At the university level, the chances of working-class boys are virtually unchanged, although those of boys from other families have more than doubled. Only one working-class boy in fifty proceeded to the universities in the post-war period, as compared with one in five of boys from other families.

It should be made clear that these trends cannot be accounted for by overt social bias in the selection process. There is conclusive evidence[1] to show that awards of places in grammar schools and universities are made today (as they were not before 1945) to children of all classes on equal intellectual terms; that is to say that the social distribution of available places closely reflects the social distribution of measured intelligence. It is nevertheless not the case that the differences in over-all "class chances", revealed in Table II can be attributed simply to social class differences in measured intelligence, well attested though these be. They must be accounted for in part by the pressure of population in the post-war years, and in part by the wide local variations in grammar school provision, associated with variations in the social composition of the population. That social class differences in ability as measured by intelligence tests are by no means alone responsible for the existing social class inequalities of educational opportunity, is convincingly demonstrated in the section of "the Crowther Report", dealing with the distribution of latent ability.

The following table, compiled from data provided in the Report, shows the social differences in opportunity which prevail in England even as between children at the same general level of ability.

In the second order of ability, 58.6 per cent of the Army

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[1] Cf. Jean Floud, A. H. Halsey, and F. M. Martin, *op. cit.*

TABLE III. SOCIAL CLASS DIFFERENCES IN THE SCHOOLING OF ARMY RECRUITS (1956–58) AT TWO LEVELS OF ABILITY

SECONDARY SCHOOLING	FATHER'S OCCUPATION									
	PROFESSIONAL AND MANAGERIAL		CLERICAL AND OTHER NON-MANUAL		SKILLED MANUAL		SEMI-SKILLED MANUAL		UNSKILLED MANUAL	
	GROUP		GROUP		GROUP		GROUP		GROUP	
	1	2	1	2	1	2	1	2	1	2
	%	%	%	%	%	%	%	%	%	%
Independent or grammar	89.4	58.6	86.8	32.4	76.0	22.1	77.0	18.0	55.0	14.0
Technical	6.8	10.5	7.5	14.2	10.8	11.0	9.0	11.3	22.2	12.3
All selective.....	96.2	69.1	94.3	46.6	86.8	53.1	86.0	29.3	77.2	26.3

Source: Compiled from Table 2a, 15–18 ("The Crowther Report") Vol II, H.M.S.O., 1960, p. 120.

recruits in the sample whose fathers were of the professional and managerial class had attended grammar or independent schools. At the same level of ability, only 22 per cent of the sons of skilled workers had done so—and it is not the case, as might be hoped, that more of them had attended technical schools instead. Even in the first order of ability, the social differences in schooling are marked. It seems that the post-war movement of educational reform has brought the abler sons of the skilled working-class into the grammar and technical schools. But ability and opportunity are still in imperfect relationship, with social class as the intervening variable.

ABILITY, SOCIAL CLASS AND EDUCATIONAL PERFORMANCE

We come now to the second important aspect of the relations between social class and education—its influence, at any given level of ability, on the volume and direction of pupils' energies and consequently on their output or performance in school.

It must be admitted at the outset that although the relations between ability, social class and educational performance are known in broad terms they have not yet been precisely worked out. In the first place, we do not yet know how the relations hold as the variables fluctuate. McClelland remarks pertinently in the course of an attack on the supposed linearity of the relationship of intelligence-test scores to school performance:[1]

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[1] D. McClelland, *et al., Talent and Society*, New York: Van Nostrand, 1959, pp. 12–14.

"Let us admit that morons cannot do good school work, but what evidence is there that intelligence is not a threshold type of variable; that once a person has a certain minimal level of intelligence, his performance beyond that point is uncorrelated with his ability?" And he urges "the desirability of plotting carefully the relationship of ability-test scores to performance criteria *over the entire range* in order to check for threshold, deceleration, or other curvi-linear relationships." We evidently need a thorough investigation of the relationships between these three variables throughout the whole range of each.

In the second place, insofar as we have established these relations, we do not as yet know what they might mean. What are the differences of family environment underlying the closer dependence of school performance on home background than on I.Q.? The influence on performance of two features of the family—its size and socio-economic status—has been repeatedly and conclusively demonstrated. A brief discussion of these will illustrate the state of our knowledge.

Class as a socio-economic handicap. There is a well-known positive relationship between socio-economic status, as judged by father's occupation, and intelligence-test scores; but there is a significantly closer relationship between father's occupation and success in school. This may express anything from the crude impact of gross material or economic handicap to imponderable, cultural determinants of motivation.

Absolute poverty needs no discussion. Fees cannot be paid, nor can adolescent earnings be foregone by the family; malnutrition and overcrowding in the home are obvious impediments to learning. General social reform is the only answer to these conditions; they cannot be lived down in school. However, they need not be exacerbated by allowing the traditional association of poor homes with poor schools to persist; and they may be mitigated in the case of the small minority of talented children who survive their circumstances or rise above them, if scholarships and maintenance allowances are generously awarded. Even with such a programme of educational aid, however, the authorities must be prepared for wastage of talent, in the shape of underachievement in the primary schools and a more or less substantial "refusal-rate" in respect of places offered in secondary schools and universities to the able children of impoverished families.

Relative poverty or material hardship is less easy to define and deal with, mainly because the question of incentives enters in once a certain crippling level of absolute poverty is left behind. Income probably behaves as a threshold variable; at a certain low level it acts as a direct impediment to a child's educational chances, even where parents are favourably disposed; at a certain high level it liberates, making it possible for parents to implement without difficulty their interest in their children's education. At any level between these extremes, however, it does not act as an independent variable at all. It follows that in circumstances such as those prevailing in Britain, where absolute poverty, at any rate among the families of young children, is at a minimum, but where an income of any size is obtained by the fathers of only a fraction of any age-group, the attitudes of parents and children towards education are of prime importance in the under-development of talent and should be deliberately cultivated if an improved educational harvest is desired.

La famille éducogène. Parental attitudes are the principal ingredient in the sub-culture which a social class represents from the point of view of the school. They are at once symbol and source of social differences in the educational performance of children at the same general level of ability.

The French have coined the apt phrase "la famille éducogène" to describe families providing for their children an educative environment including, in particular, supporting social and intellectual pressures in the same direction as those exerted by the schools. For obvious reasons, such families are proportionally more numerous at the top of the social scale, and it is possible also that they are qualitatively superior as well; but the notion is to some extent relative.

At any given social level, "la famille éducogène" as so far identified by investigators, need not be more prosperous, though it tends to be smaller than average; it is likely that the parents will have had some education beyond the compulsory minimum; the mother before marriage may have followed an occupation superior to that of the father; and the climate of opinion in the home will be educationally favourable by such elementary criteria as willingness to visit the school and talk with teachers, and a knowledgeable approach to educational facilities. The children of such families will tend to be more successful on average, both as regards competition for entry to selected schools and universities, and as regards propensity to stay the course once admitted.

The following table illustrates these points:

TABLE IV. AWARDS OF PLACES IN SECONDARY GRAMMAR SCHOOLS IN RELATION TO VARIOUS FEATURES OF CHILDREN'S HOME BACKGROUND IN AN ENGLISH LOCALITY, 1952

FEATURES OF HOME BACKGROUND	AWARDS OF GRAMMAR SCHOOL PLACES TO CHILDREN OF FATHERS FOLLOWING VARIOUS OCCUPATION							
	SKILLED MANUAL		UNSKILLED MANUAL		NON-MANUAL		ALL 11-YEAR OLDS, 1952	
	NO. OF CHILDREN	% AWARD	NO. OF CHILDREN	% AWARD	NO. OF CHILDREN	% AWARD	NO. OF CHILDREN	% AWARD
1. *Income* of chief wage earner rated:								
High[1]	378	19	81	9	208	34	667	22
Low	213	16	215	13	194	31	622	20
2. *Father's education*:								
a) Secondary:								
Selective	82	21	23	13	205	42	310	34
Other	541	16	286	12	231	24	1,058	17
b) Further:								
Some	160	26	27	22	223	38	410	40
None	472	14	286	11	244	28	1,002	16
3. *Parents' attitudes towards education*:								
a) Discussed child's education with primary teacher:								
Yes	268	27	95	22	287	38	650	31
No	364	10	217	7	179	20	760	12
b) Preference expressed for:								
Grammar school	304	29	135	21	322	47	761	31
Modern school	328	6	178	4	145	19	651	8
c) School leaving age preferred:								
18+	145	35	44	27	188	49	377	41
16–17	250	16	102	17	188	28	540	21
15 (compulsory minimum)	226	6	159	3	81	7	466	5
4. *Family Size*:								
1–2 children	277	21	122	17	255	35	654	26
3–4 children	245	12	126	11	169	31	540	18
5+ children	108	17	64	2	42	21	214	13

Source: Jean Floud, A. H. Halsey, and F. M. Martin, *Social Class and Educational Opportunity*, London, 1956, pp. 104–7.

[1] The definition of 'high' income varied according to social class status: Non-manual: £10 p.w. or over. Manual: £7.10. p.w. or over.

It is true that, such figures are open to the objection that they merely reflect differences of intelligence among parents which are adequate to account for the different success rates of their children in the secondary selection examination. But investigations which have taken intelligence as well as family environment into consideration in trying to account for differences in school performance, show the closer dependence of the latter on family environment.[1]

These findings must cause one to take another look at the correlation between socio-economic status and school performance. It may be differently expressed as a social distribution of "familles éducogènes"—by saying that such families are proportionally more numerous with each step up the social scale. The question then arises: what factors make for a change in this distribution? (Under what conditions can we expect a weakening of the correlation between socio-economic status and school performance?). Before turning to this question we must briefly note the bearing of family size on educational performance.

Family size and educational performance. It is a well established fact that children from small families *at all social levels* tend, on the average, to perform better both in intelligence tests and at school. There seems to be little doubt that, as a recent investigator put it, "the presence of a large number of siblings (or some factor related to it) is an adverse element as far as educational attainment is concerned, quite apart from the low intelligence usually associated with large families.[2] This relationship obviously has its economic aspect even in the Welfare State. It has also been suggested, more subtly, that the child of a large family learns the verbal skills, so decisive both in intelligence tests and in school performance, less effectively from his peers than does the child of a small family from adults, and carries the handicap at least until the age of eleven.[3] But there must be more to the matter than this. Quite apart from class differences in the strength of the influence of family size on children's verbal development, which have not been investigated but are probably considerable, there is some evidence to the effect that the educational disadvantages of a large family are less marked for the children of Catholic parents, even at the bottom of the social scale.[1] If generally true, this would cast doubt on the notion that the significance of a small family for educational performance should be sought in some distinctive quality of educational value in the environment it provides. It would lend colour to the suggestion that for children at a given social level, relative size of family is, generally speaking, symptomatic of parental attitudes and family pressures favourable to a child's educational progress—the best index, in fact, of "la famille éducogène" in all cases where religious principles do not prohibit the expression of these favourable attitudes in family limitation.

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[1] E. Fraser, *Home Environment and the School*, University of London Press, 1960. See also A. Girard, "Mobilité sociale et dimension de famille; enquête dans les lycées et les facultés", *Population*, 1951, pp. 103–124.

[2] E. Fraser, *op. cit.*

[3] J. D. Nisbet, *Family Environment: A Direct Effect of Family Size on Intelligence*, London, 1953.

We thus arrive at the suggestion that once the grosser material handicaps are eliminated and parents' attitudes come into their own as independent variables, the size of the family, rather than its socio-economic status, emerges as potentially the most important single indication of the educative quality of home environment. However, a frontal attack on the problem of the determinants of family size at different social levels is notoriously difficult. We must be content in the short run to examine some of the more accessible differences of family culture, of which size is for the time being a general indication, and of which parents' attitudes towards their children's education and subsequent occupations are a particular manifestation.[2]

SOCIAL CLASS AND THE DEMAND FOR EDUCATION

Here we return to the question raised above of the conditions under which the correlation between socio-economic status and success in school may be weakened by the spread of "la famille éducogène". Parents' attitudes towards education are, in the short run, class-typed. What is the effect of social policy on these attitudes? Do "middle-class" educational attitudes spread hand-in-hand with "middle-class" prosperity? To some extent this will happen, especially since the spread of prosperity is bound up with a scale and pace of economic development which itself generates a public thirst for educational qualifications. Affluence does not breed "la famille éducogène", but it provides both incentives and the means for such families to become widespread. Evidence has already been gathered of a post-war transformation of the attitudes of parents in England to their children's education. The Crowther Committee, in its recent report, urges the Government to ride on the crest of this wave of public interest and to raise the school-leaving age to sixteen, noting that parents do not in general allow their children to receive less education than they themselves have had, so that the process of extending educational opportunity is cumulative from one generation to the next.

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[1] Jean Floud, A. H. Halsey, and F. M. Martin, *op. cit.*

[2] For some indication of the position in the United States, see J. A. Kahl, "Educational and Occupational Aspirations of 'Common Man' Boys", *Harvard Educational Review*, Summer, 1953.

However, even under conditions in which the demand for education is rising generally, social-class influences may continue to distort the pattern of *effective* demand. Thus, the rising demand from working-class families for a selective and extended education for their children, their success in competition for places in the grammar schools in which this demand can be met, and the upthrust of advanced courses in the secondary modern schools catering overwhelmingly for working-class children, are common-places of the English educational scene. Yet the fact remains that there is quite severe class-based wastage and early-leaving from these grammar schools.[1] Table V illustrates this:

TABLE V. CONTRASTS IN THE OCCUPATIONAL COMPOSITION OF THE GRAMMAR SCHOOL-LEAVERS UP TO, AND OVER, 16

SCHOOL COMPOSITION		
PARENTAL OCCUPATIONAL GROUP	LEAVERS UP TO 16 %	LEAVERS AT 17 AND 18 %
Professional and managerial	17	39
Clerical and other non-manual	17	20
Skilled manual	51	34
Semi-skilled manual	9	5
Unskilled manual	6	2
Total = 100 %	863	579

Source: 15–18 ("The Crowther Report") Volume II, H.M.S.O. 1960, p. 132.

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[1] For relevant evidence of a comparable situation see A. Girard, "L'Enquête nationale sur l'orientation et la sélection des enfants d'âge scolaire", *Population*, 4, 1954.

The social as distinct from the purely academic character of the process of attrition at the secondary stage which is illustrated in Table V is well established. Thus, for instance, it has been strikingly demonstrated that changes in the rank order of children on entry to the English grammar school are not random but are systematically related to their social class origins, so that the proportion of children in the top one-third of the performance hierarchy who are drawn from working-class families falls from about two-thirds on entry to around one-third at the end of the seven-year school course.[1]

It is important to realise, however, that social selection disguised as academic selection is a process at work in all schools. By the time children reach the threshold of secondary education at the age of eleven, those drawn from certain social groups have as a whole already begun to outstrip scholastically those from families at the other end of the scale, and the same process is continued among those selected for grammar schools during their time there.

It is not merely that children from the higher social classes are more intelligent than others (in the sense that on average they score better in tests of intelligence). Table V reflects the further striking fact that improvement in school performance between 11 and 16 within the highly select group of grammar school pupils, which raises many from the bottom group on entry to the top group on completion of the course, is most common among the children of professional and managerial workers; while the corresponding deterioration which causes many placed in the top group on selection to fall to the lower group on completion is most common among the children of semi- and unskilled workers.[2]

This seems to indicate a problem of social assimilation. The grammar schools grew up to serve the middle-classes, and although before 1945 a highly selected minority of able working-class children was satisfactorily assimilated, the much larger post-war contingents have proved difficult. But American experience, essentially similar, but less well-defined in the context of a non-selective school system, makes it clear that the problem is

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1. *Early Leaving*, H.M.S.O., 1954.
2. *Ibid.*

not specific but general, and must be thought of in broader terms.

Within very wide limits, the educability of children is determined by the subtle interaction of the social influences of homes and schools. We are beginning to understand the influences of social background—the powerful influence of imponderables, such as the parents' ambitions for the family, the standard of living aimed at, and their conception of their responsibility towards their children—which form fairly clear patterns centred in the socio-economic status of the home. But of schools and the conditions of success in them we know very much less, so that we remain ignorant of many hidden characteristics of the learning situation.

III

A modern economy depends on maximising the educational output of every individual, which is to say that the aim of policy must be to maximise the supply of and the demand for educational facilities.

Historically speaking, the problem of supply has loomed largest, and in many countries represented in this Conference, it will continue to do so for some time ahead. The problem presents itself as, in the main, a financial and organisational one: how to achieve a sizeable, flexible and differentiated system of schooling and higher education? But with the advance of industrialism, the problem of demand takes on a new importance. How, within the indispensable framework of a flexible and differentiated educational system, to estimate the public appetite for education, locate and assess its strength and weakness, stimulate it and provide for its realisation in improved educational levels?

Educational policy in any event to-day must depend heavily on the findings of social research. At the simplest level, continuous sample surveys are desirable of the social, geographical and intellectual composition of entrants to and leavers from secondary and higher educational institutions of various types; and parental attitudes towards their children's education and vocational prospects need frequent assessment. At a more sophisticated level, there are problems of the structure and functioning of schools and colleges in relation to the motivation and achievement of pupils and students—for instance, the effects of social distance between pupil and teacher, or of social climate, on the fixing of "norms of output" in school and the level of competitive tension.

But it is worth emphasizing, in conclusion, that the kind of information yielded by the simpler kind of sociographic investigation can be obtained in the ordinary course of local or central government administration. Occasional *ad hoc* social investigations such as have been undertaken in Britain since the war for the statutory Central Advisory Council for Education (for example, into "early leaving" from grammar schools, or the distribution of "latent ability") serve their immediate purposes, but not the recurrent needs of policy-making. The design and use of ordinary statistical returns to serve these needs would make it possible to maintain an invaluable continuous check on the distribution and utilisation of educational opportunity by children of varying ability and social background. Within an assured context of basic information of this kind, private and academic social investigators could profitably and economically devote themselves to more complex and intensive research into the workings of the processes of social selection and differentiation through education which largely determine its efficiency in relation to the economy and policy of a modern industrial society.

CHAPTER 5

EDUCATIONAL STRUCTURE AND THE DEVELOPMENT OF ABILITY

Torsten HUSÉN

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The school does not operate in a social vacuum but is involved in a continuous interaction with the surrounding society and is thus influenced by the historic, economic, and social forces characteristic of the society the school is serving.

The great dilemma with which most countries in Europe have been faced when extending compulsory schooling and changing school organisation has been the connection and/or integration of the common elementary school with the university-preparing academic type of school. The attempts to create a unified or comprehensive school organisation have come up against historic and social forces according to which the two school types are designed for different social classes and therefore each have a different amount of prestige.

This problem of connecting the two school types has not arisen in the United States, since the school system there has grown out of public efforts to raise the educational level of the masses, and the Latin school has not played the same role as in Europe, where it was the dominant type of school until the nineteenth century.

But, apart from the specific school organisations in the various countries of the Western world, the basic issue in many countries has recently been how to organise the school in such a way as to promote all types and all degrees of ability. I refer to the school reforms in the Scandinavian countries, in France in 1959, and to the report of a Committee in the Federal Republic of Germany.[1] In pedagogical circles the problem has often been *if, when* and to *what extent* the academically talented children should get separate instruction to ensure that they are not hampered by their more slow-learning fellows. In Sweden the key-word for the heated debate during the past ten years on the organisation of the "comprehensive" or "unitary" school has been "differentiation", i.e. at what stage the pupils with high scholastic ability should be transferred to separate classes and/or courses.

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[1] T. Husén and S. Henrysson, (Eds.), *Differentiation and Guidance in the Comprehensive School, Report on the Sigtuna Conference in 1958*, Stockholm: Almqvist & Wiksell, 1959.

The main problem I am going to deal with in this paper may be phrased as follows: What kind of school organisation, selective or comprehensive, provides the best conditions when catering for able pupils? After having attempted to define the problem, I shall deal in turn with its various aspects. When making a balance-sheet for each of the two systems, these aspects will have to be evaluated. It is, however, essential in this context to make explicit the objectives in terms of which the merits and drawbacks of the two systems are assessed. If the main objective of school instruction is to give each child a chance to develop its potentialities to an optimum, then one should try to build up an educational structure that provides maximum flexibility and avoids selection at an early age. If on the other hand the main purpose is the cultivation of talent, diagnosed at an early age, then one should build up an educational structure which successively singles out the academically talented children, irrespective of the price that is paid.

I shall here analyse the consequences of both types of educational structure and try to evaluate to what extent they really are catering for children with ability.

The following aspects will be dealt with:

1. What are our possibilities of making valid predictions as to suitability for higher education?
2. To what extent might educational selection be correlated with social factors, and to what extent does loss of talent occur in this connection?
3. To what extent does attrition rate mean loss of talent?
4. What are the real effects of making school classes more "homogeneous" in terms of scholastic aptitude?

PREDICTING ACADEMIC ACHIEVEMENT

The transfer from primary to secondary schools in most European countries is the most decisive step in a child's educational career. The reason for this is that the different kinds of secondary schools enjoy different degrees of prestige; that of the pre-university or grammar school type being the highest. The background for this in modern society has been pointed out by Floud and Halsey: "In an industrial society, education is inevitably increasingly involved with the dynamics of the class structure and with the economy. We are familiar with the tightening bond between occupation and social class, and between education and occupation; and whatever the characteristic mode of educational organisation, it seems inevitable that schools, colleges and universities should perform selective functions which, to a greater or lesser extent, tend to overlay, or possibly impede, their pedagogical purposes."[1]

The situation in the university-preparing secondary school is characterized by a shortage of places in most countries which has called for some sort of selection, and which has, in its turn, inspired educational research in these countries to study the methods of assessment used. It would be beyond the scope of the present paper to summarize the research evidence found on this point in various countries, especially since we are dealing here with very complex technical matters. I shall, therefore, limit myself to certain aspects and point out their implications for our problem: the identification and promotion of ability.

Within the framework of the rigid bipartite system, the selection for the more prestige-loaded academic type of secondary education in many countries takes place at the age of ten or eleven. Those who are not selected, complete their compulsory schooling in the common elementary school. One might, of course, question whether selection of pupils with scholastic ability should take place at such an early age, and I shall later make casual reference to the discussion on that problem which took place in Sweden when the structure of the compulsory school system was studied. Given a certain organisational structure, with what degree of accuracy can a selection be made with the methods at present at our disposal?

The so-called eleven-plus examinations have been under constant public consideration in England since the adoption of the 1944 Education Act and a good deal of research has been devoted to the predictive efficiency of the methods used by the

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[1] J. Floud and A. H. Halsey, "Homes and Schools: Social Determinants of Educability", *Educational Research*, 3, 1961, pp. 83–87.

Local Authorities. The experience and research evidence gained, have been summarized by a group of British psychologists[1] and by the National Foundation for Educational Research in England and Wales.[2] Both inquiries point out that the problem of selection for grammar school education should not be regarded only as a purely technical one, i.e. that of devising the best possible methods of assessment. The selection in itself has grown as a result of historical, administrative, political and social causes which are not affected by changes in the selection procedure.[3]

A great many investigations into the predictive value of different methods have been carried out in the United Kingdom. The validity criterion has very often been based upon performances in the secondary school one or two years after admission and less frequently upon the marks obtained later in the School or General Certificate. The real "proof of the pudding" is, of course, in the long-term performance at university level. But even that would not suffice to elucidate satisfactorily the problem of the predictive efficiency, since most research workers are unable to assess the number of students who have been rejected in error. With these limitations in view, the British Psychological Society Committee gives the following overall evaluation of the present selection procedure: ". . . it may be said that the usual combination of intelligence, English and arithmetic tests reaches a very high degree of validity (the intelligence test being usually the best single predictor); and that when teachers' scaled estimates are also included, selection is about as accurate as it can be, *in view of the natural alterations in interests and abilities as children grow older*. Predictions of good or weak performance within the restricted grammar school population are, as would be expected, less accurate. Even with a validity co-efficient of 0.90, we would expect roughly one quarter of those accepted to do badly in the grammar school (when the entrance rate is 20 per cent), and some 6 per cent of those rejected to show equal or better achievement later."[4] On the basis of the follow-up studies conducted at Twickenham, Yates and Pidgeon arrive at the following conclusion: "Even the use of the best methods of allocation that, on the basis of our present knowledge, can be devised, is likely to involve errors in the allocation of approximately 10 per cent of the candidates."[1] Therefore, it is recommended that any system of allocating pupils to grammar school courses should be made sufficiently flexible to allow for the subsequent transfer of children who are identified as having originally been wrongly allocated.

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[1] P. E. Vernon, (Ed.), *Secondary School Selection*, London: Methuen, 1957.

[2] A. Yates and D. A. Pidgeon, *Admission to Grammar Schools*, London: Newnes Educational Publ. Co., 1957.

[3] P. E. Vernon, *op. cit.*, p. 167, and A. Yates and D. A. Pidgeon, *op. cit.*, p. 175.

[4] P. E. Vernon, *op. cit.*, p. 171.

The experience of countries where selection for the university-preparing school takes place at the age of ten or eleven indicates the fatal finality of the procedure. From the investigations reported in "Early Leaving",[2] we learn that only about 3—4 per cent of the grammar school population consists of pupils who have been transferred from secondary modern schools. Pupils who were transferred later had the same degree of success as those originally admitted to the grammar school. Similar results have been shown by Pedley.[3]

The following experiment took place in the community of Fredriksberg, close to Copenhagen.[4] After Grade 5 an entrance examination was held for those applying for the academic type of secondary school, the so-called "examination middle-school" (examensmellenskolen); in one school all the pupils who applied were admitted after taking the entrance examination. The examination results were related to later school performances:

ENTRANCE EXAMINATION

	NUMBER OF PUPILS		
	PASSED	FAILED	TOTAL
Succeeded in the middle school	65	18	83
Failed in the middle school	22	50	72
Total			155

As can be seen about 25 per cent of the pupils would have been wrongly allocated if admission had been based upon the results of the entrance examination. It should be noted that about the same number failed the entrance examination and passed the middle school as failed the middle school and passed the entrance examination.

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[1] A. Yates and D. A. Pidgeon, *op. cit.*, p. 186.

[2] *Early Leaving*, London: Her Majesty's Stationery Office, 1954.

[3] R. Pedley, *Comprehensive Education*: *A New Approach*, London: Gollancz, 1956.

[4] Personal communication from Professor Carl-Åge Larsen.

It was pointed out above that most studies of the efficiency of the assessment procedures have used some sort of short-range criterion. Research is needed into the broader aspects of the long-term benefits to be derived from the academic type of education. Since considerable changes take place over a couple of years in the factors that make up scholastic ability, one might seriously question the system of the early segregation of children from the point of view of effectively identifying and promoting intellectual ability. This was one of the issues during the 'Forties and 'Fifties in connection with the Swedish School Reform. Views on this problem have been influenced by psychologists, especially by those investigating the structure of abilities. In 1938, the Spens Committee in England issued the following statement: "Intellectual development during childhood appears to progress as if it were governed by a single central factor, usually known as 'general intelligence' which may be broadly described as innate all-round intellectual ability. It . . . can be measured approximately by means of intelligence tests . . . We were informed that . . . it was possible at a very early age to predict with some degree of accuracy the ultimate level of a child's intellectual powers, but this is true only of general intelligence and does not hold good in respect of specific aptitudes or interests."[1]

The 1940 School Committee in Sweden, which had to consider the best age of transfer from primary to secondary school, assigned one of its experts, E. Neymark, to investigate the problem from the point of view of educational and vocational guidance. After having considered the problems at length, Neymark made the following statement in his report: "In fact the psychological premises for individual vocational guidance do not on the whole exist at the earliest until 14—15 years for girls and 15—16 years for boys, i.e. not before reaching grade eight."[2] Scholastic aptitude, which depends mainly upon general intelligence, can be assessed at "all age levels and the risks of mistakes in the assessments are not very great—*nota bene*, if the teacher showed some zeal in studying his pupils objectively".[1] But very little can be said about the *specific* abilities of a child before the years of adolescence. The School Committe (1940) pointed out in its report on transfer from elementary to secondary school that, if one did not have to consider "specific aptitudes and interests", the selection for the academic type of school (realskola) could just as well take place at 11, since the pupil's aptitude to profit from such an education depended more on his "general assets" and these could "in most cases already be determined with the same accuracy at the age of 11".[2] Reference was made to statements by the psychological experts who had been requested to make inquiries into the problem. The group of Committee members, which was against an early transfer, did not doubt the psychological arguments which advocated an early "creaming off" of pupils with high general intelligence, but pointed out that the consequences would be to the detriment of the vocational schools, "which would then be deprived of their most able pupils".

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[1] *Secondary Education*. London: Her Majesty's Stationery Office, 1938, p. 123 *et seq*.

[2] E. Neymark, *Ungdomens vägledning till utbildning och yrke*, Stockholm: Statens Offentliga Utredningar, 1945, p. 70.

The 1946 Parliamentary School Commission (Report 1948), which had to consider and evaluate the material collected by the School Committee, conceived the problem of allocating pupils to appropriate types of education in terms of "theoretical" and "practical" aptitudes. The Commission carried out research into the "ability structure and factorial maturity of Swedish school children". In the first place the Commission was interested in the development of "practical" and "theoretical" aptitudes and their interrelation at various age levels. The research findings,[3] according to the interpretation of the Commission, were as follows:

1. "Practical" and "theoretical" aptitudes are positively correlated. Roughly, about one-fourth of the pupils at the age of 11 were above the average for the entire age group for *both* practical and theoretical aptitude, as measured by the tests devised. Roughly the same number were below average in both respects while slightly more than half of the children were mixed or

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[1] *Ibid*, pp. 77–78.

[2] *Sambandet mellan folkskola och högre skola*, Stockholm: Statens Offentliga Utredningar, No. 21, 1944, p. 227.

[3] Cf. J. Elmgren, *School and Psychology*, Stockholm: Statens Offentliga Utredningar, 1952.

undecided. There is thus no support for the popular conception that a compensatory relation exists, so that a child is compensated for a low scholastic aptitude by a high practical aptitude and vice versa.

2. "Practical" aptitude is "not as simple and unitary in its structure as general intelligence".[1] Moreover, the components constituting "practical" aptitude tend to mature much later than general intelligence (the Commission apparently identified "theoretical" or scholastic aptitude with general intelligence). The adolescent years with their emotional upheavals are a prerequisite for the full maturation of practical factors. "On the whole one might say that the practical aptitudes, and also the specific group factors which, besides general ability, constitute theoretical aptitude, cannot be psychologically assessed with the same degree of certainty, and as early, as general intelligence."[2]

From this the Commission draws certain practical conclusions as to the problem of differentiating or segregating children into different types of education:

1. "An early differentiation can hardly be recommended, since, apart from other reasons, practical aptitude can be assessed only later and a selection would result in a bias in a theoretical direction."[3]
2. The earlier conception of contrasting theoretical and practical ability is not valid. There is no psychological support for the organisation of a bipartite system with a "bifurcation" into theoretical and practical streams. Differentiation must therefore be much more flexible so that many combinations of practical and theoretical abilities can be considered by the school.

The Commission pointed out that, if an early differentiation were made between various streams or types of school (at 11, as was previously the practice in many places) scholastic aptitude would then be the only determining factor. Not only pupils with high theoretical and low practical ability would be allocated to the academic stream or type of school but also the élite among the pupils, i.e. those with both theoretical and practical aptitudes. This would then imply that the practical occupations would be deprived of all people with high general ability, which would not only lower the prestige of these occupations but also undermine "democracy".[1]

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[1] *1946 års skolkommissions betänkande med förslag till riktlinjer för det svenska skolväsendets utveckling*, Stockholm: Statens Offentliga Utredningar, No. 27, 1948, p. 68.

[2] *Idem.*

[3] *Idem.*

Thus, the Commission does not doubt the possibility of making a selection in terms of scholastic ability at an early age but rejects, on social grounds, the conclusion that most of the able children should be selected and transferred to the academic type of education, the reason being the danger of depriving the "practical" occupations of talented people and of causing cultural and political disunity.

I shall not deal here with the debate which arose from the main report of the Commission and the publications of its research findings later. A good deal of criticism was made against the research findings and the conclusions drawn from them. Thus Sjöstrand,[2] who has been the most energetic critic of the School Reform, asked how it would be possible not to assess the practical aptitude until the age of 15 and at the same time maintain that the relation between practical and theoretical ability could already be studied at the age of 11. In my view, the criticism concerning the development of practical aptitudes was even more serious, since this had been studied by the cross-sectional method. One might question to what extent the tests used were valid instruments for measuring the practical factors.

It is evident that aptitudes are moulded by the cultural and social factors influencing the society within which the school is operating. Thus, the dichotomy "theoretical" and "practical" can be regarded as a reflection on the occupational stratification: professions demanding some type of academic training on the one hand and manual occupations on the other. In the former types of occupation a high demand on the ability to operate complex symbols is put upon the incumbents. Those who are proficient in one way or another in manipulating symbols—scientists, lawyers, engineers, etc.—are the rulers and masters of modern society. Most of our so-called intelligence tests are validated against criteria which measure some sort of verbal ability. A certain level of verbal intelligence is a necessary prerequisite for a successful career in general education, which in its turn is a necessary prerequisite of obtaining a high-quality specialised education. The committee of British psychologists who investigated the selection for secondary education pointed out the verbal bias in the procedure: "The present bias of selection towards a linguistic-academic type of education and the relative neglect of technical education, are open to criticism." It also points out that the common notions of practical versus academic children are misleading. "Classification or streaming of pupils by different types of aptitude and interest is possible only to a limited extent at 11, and allocation must be based chiefly on general ability and all-round attainment." The committee emphasizes that "children's abilities are more variable than was earlier supposed, and that rigid streaming may have harmful educational and social consequences though these are often exaggerated".[1]

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[1] *Ibid*, p. 70.

[2] W. Sjöstrand, *Skolreformen i stöpsleven*, Stockholm: Natur & Kultur, 1954.

In the Swedish Comprehensive School there has been a system of options on the secondary level (Grades 7 through 9). These options have been combined with so-called alternative courses in certain subjects, such as mathematics, English and physics. Since German (besides English) is a compulsory subject in the Gymnasium (Grades 9 through 12), many pupils take German in Grade 7. In most school districts the pupils are grouped into classes in Grades 7 and 8 according to their choice of subjects and alternative courses. The outcome is that those who have taken German constitute the "academic" classes, which means that they have also chosen the more difficult alternative courses. In principle, the choice of subjects and alternative courses should be quite free. "Freedom", in this case, means that it should be possible to choose any type of combination of subject area and alternative course, without being decisively streamed into a certain direction until Grade 9. Thus the system should provide for the greatest possible flexibility in Grades 7 and 8, so that the pupils could "explore" themselves and find out their liabilities and assets before having to make a definitive choice of the studies they would like to pursue in the future. The actual experience of the experimental activities during the 'Fifties has not, however, fitted into this ideal picture of far-reaching freedom. The changes that have taken place have been mainly from two foreign languages (English and German) to one or no language at all. In a very few cases the students have been "sluiced" from the more "theoretical" subjects or courses. As a result of these experiments, the 1957 Parliamentary School Committee devised a system which provides certain combinations and restricts the amount of choice but, at the same time, avoids the loss of pupils who are interested and have ability in mathematics and science—a loss which results from a system in which proficiency in foreign languages is imperative for the promotion to the university-preparing Gymnasium.

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[1] P. E. Vernon, *op. cit.*, p. 168.

As shown above, it is usually asserted that academic aptitude can be assessed at an early age, say 10 or 11, with a sufficient degree of accuracy. This assertion, however, needs the qualification that, *within our present social system,* one can determine the actual scholastic ability of a child and predict its academic achievements with a fairly high degree of accuracy for a period of a few years. Scholastic ability is crystallized by the school over a period of two years, and the tests used to measure it are validated against short-range criteria, such as actual school achievements or teachers' estimates. The diversified group of factors constituting "practical" ability is not crystallized in the same way and the evaluative criteria of practical achievements are not homogeneous to the same extent as are those of academic achievements. In my view, then, it can be regarded as self-evident that theoretical aptitude can be assessed relatively early but that "practical" aptitude "matures considerably later than general intelligence", as was stated by the School Commission.

THE EFFECT OF SELECTION UPON THE PROMOTION OF ACADEMIC TALENT FROM VARIOUS SOCIAL STRATA

There are two types of "selection" or "screening" which are of interest in this connection; the first when transferring the pupils from the primary to the academic secondary school; the second a continuous screening during the secondary stage and which is measurable by the number of pupils who double a grade or who drop out. The early identification of pupils with high scholastic ability and the rigorous selection between one stage and another constitute the measures taken by educational policy makers in most European countries in order to guarantee a high intellectual standard for university enrolment. It is evident that in several countries a high price is paid for the outstanding quality of the university students. I am not going to investigate the problem of whether the selective system which exists in most countries yields results worth the price paid, but will limit myself to the one aspect of the problem which is of interest here, namely how much of the potential university population we might lose by the various screening procedures.

It has been shown from various research studies that selection for secondary schools is correlated with social factors and that the striking disproportion beween the social classes can be accounted for to some extent by the system itself.[1]

In 1955, the Comprehensive School was introduced in the southern part of Stockholm, which meant that the pupils were kept together in undifferentiated classes during the first six school years (from 7 to 13), after which there was a possibility of being transferred to an academic type of school or of proceeding during the remaining three compulsory school years in the comprehensive system. In the northern and western part of the city the old, "parallel" or dual system was continued for a few years, which meant that some pupils were transferred to the academic type of school after the fourth school year (at 11) or after the sixth school year (at 13). The change provided us with an extraordinary opportunity to study the two systems, the selective and the comprehensive, operating side by side. The findings of a follow-up study covering five school years will be dealt with below. An important by-product of the investigation was a study of how selection from the fourth grade in the elementary school to the first grade in the pre-university school functioned in terms of social class and scholastic ability according to school marks, standardized achievement tests and intelligence tests.

Since the number of applicants considerably exceeds the number of places available, admission is based upon the calibration of school marks by means of standardized achievement tests in reading, writing and mathematics. As part of the investigation, a group intelligence test was taken by the entire fourth-grade population in Stockholm. We thus had three different criteria of ability at our disposal, viz. school marks, intelligence test scores and composite achievement test scores (based upon eight tests). Each of these criteria has been shown on a 9-point scale (the so-called "staninescale"), with an average of 5. Tables I to III show the results of the selection.

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[1] See e.g. J. Floud, *et al.*, *Social Class and Educational Opportunity*, London: Heinemann, 1956, and T. Husén, "Loss of Talent in Selective School Systems: The Case of Sweden", *Comparative Education Review*, 4, 1960, pp. 70–74.

TABLE I. PERCENTAGE OF NON-APPLICANTS FOR ADMISSION TO PRE-UNIVERSITY SCHOOL, BY SCHOOL MARKS AND SOCIAL CLASS

In percentage.

NUMBER OF MARKS	SOCIAL CLASS		
	UPPER (n = 1113)	MIDDLE (n = 2264)	LOWER (n = 2394)
9	8	5	11
8	6	8	14
7	12	10	14
6	16	31	49
5	47	65	86
4	68	86	97
1–3	(No applicants, since minimum requirements for consideration were not reached)		

As can be seen from Table I, the number of non-applicants is about the same in all the three social classes on the highest level (i.e. the best 20 per cent of the pupils), but there are striking differences among pupils with average school marks, where twice as many from the upper as from the lower social class apply for admission. Since the marks from the school's point of view are the best criterion of scholastic aptitude, these differences should be kept in mind. Table II presents the same picture when the composite achievement test score is used as a criterion of scholastic aptitude.

The differences between social classes are fairly high in the high-scoring groups. This indicates that a considerable number of pupils with high performances do not even apply for admission to the pre-university school.

In Table III, finally, we have used the intelligence test scores as a criterion of scholastic aptitude. As was the case when adopting the attainment tests as a criterion, we find that considerable differences exist between social classes and that a fairly large number of high-scoring lower and middle class pupils do not apply for admission.

TABLE II. PERCENTAGE OF NON-APPLICANTS FOR ADMISSION TO PRE-UNIVERSITY SCHOOL, BY SOCIAL CLASS AND ACHIEVEMENT TEST SCORES

In percentage.

LEVEL OF ACHIEVEMENT TEST SCORES	SOCIAL CLASS		
	UPPER (n = 896)	MIDDLE (n = 1789)	LOWER (n = 1913)
9	9	12	21
8	10	14	26
7	12	25	34
6	26	34	58
5	42	57	79
4	60	80	91
3	56	90	98
2	100	94	99
1	100	97	98

TABLE III. PERCENTAGE OF NON-APPLICANTS FOR ADMISSION TO PRE-UNIVERSITY SCHOOL, BY SOCIAL CLASS AND INTELLIGENCE TEST SCORES

In percentage.

LEVEL OF INTELLIGENCE TEST SCORES	SOCIAL CLASS		
	UPPER (n = 1023)	MIDDLE (n = 2102)	LOWER (n = 2241)
9	13	15	34
8	11	23	28
7	18	26	55
6	18	41	60
5	30	53	76
4	42	64	82
3	53	80	92
2	79	87	93
1	86	93	95

It should be mentioned that, in spite of the relatively low number of applicants from the lower social class, about the same percentage of applicants from this group has been admitted to the pre-university school.

I shall not in this context enlarge upon the possible causes of the social class differences observed but will merely point out the fact that, according to criteria adopted by the school itself, a fairly high number of academically talented pupils from middle or lower-class homes do not even apply for admission to schools providing academic education, in a situation where transfer on a selective basis takes place at a fairly early age. We therefore arrive at the tentative conclusion that, when selection in a double stream system is made at an early age, a large amount of talent is "lost". A reasonable hypothesis is that, if "creaming-off" of the academically talented is postponed to a later age or if they are taken care of within a more flexible comprehensive system, they are more likely to commit themselves to a longer and more promising school career. In those Swedish rural districts where the 9-year comprehensive school was introduced during the 'Fifties and where roughly 25 to 30 per cent of the age groups have been provided with the equivalent of the Realskola education (lower section of the pre-university school), the Gymnasium enrolment has been twice that of comparable districts where there is no provision beyond a seven-year elementary school.

FAILURE RATE IN THE PRE-UNIVERSITY SCHOOL AND LOSS OF TALENT

A considerable proportion of those admitted fail during the course of their secondary schooling. The 1940 School Committee[1] followed up some eleven thousand pupils through the lower section of the pre-university school. Only half the pupils reached the leaving examination or were transferred to the Gymnasium within the normal number of years. A fifth of the pupils repeated at least one grade. The situation is similar in the Federal Republic of Germany, where the overwhelming majority of pupils admitted to the Gymnasium at the age of ten do not reach Abitur at all.[2] In England a special inquiry was conducted on a ten per cent sample of pupils admitted to grammar schools in 1946.[3] Their grammar school records were related to the entrance examinations and to their fathers' social class. Those who did not complete a five-year course, did not obtain a school certificate, or did not have at least three passes, were regarded as failures. According to that definition, 38 per cent failed. The failure rate was approximately the same for those who had transferred from secondary modern to grammar schools.

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[1] *op. cit.*, p. 99 *et seq.*

[2] Cf. U. Undeutsch, "Auslese für und durch die höhere Schule", *Bericht über den 22. Kongress der deutschen Gesellschaft für Psychologie*, Göttingen: Hogrefe, 1959.

[3] *Early Leaving*, *supra* p. 117, footnote 2.

The pupils had been classified according to the schools' opinion of the type of course for which each pupil was best suited. It was found that, according to the criterion adopted, about 10,000 of the pupils enrolled at grammar schools, besides the 17,000 who actually completed advanced courses, could have benefited from them had they stayed on at school. But this calculation does not include those who were allocated to secondary modern schools at the age of 11, since they had failed to secure admission to grammar schools. The receiving schools were asked to divide the intake into three equal groups according to the marks obtained in the selection test. Future performances could then be related to the starting merits. The failure rates by entrance qualifications and social class are presented in Table IV.

TABLE IV. PERCENTAGE OF FAILURES IN ENGLISH GRAMMAR SCHOOLS, BY SOCIAL CLASS AND ENTRANCE QUALIFICATIONS

In percentage.

FATHERS' SOCIAL CLASS	ENTRANCE STANDING		
	BEST	MIDDLE	LOWEST
Professional and managerial	10	25	34
Clerical	19	32	42
Semi-skilled..................	38	58	62
Unskilled	54	62	76

It is stated in the Report: "Still it is beyond doubt true that a boy whose father is of professional and managerial standing is more likely to find his home circumstances favourable to the demands of grammar school work than one whose father is an unskilled or semi-skilled worker. The latter is handicapped."[1]

A study of "premature leavers" and grade-repeaters of a representative sample of more than 10,000 pupils admitted to the lower sections of the secondary academic school in Sweden was conducted by Orring[2] on behalf of the Parliamentary School

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[1] *Ibid*, p. 19.

[2] J. Orring, *Flyttning, kvarsittning och utkuggning i högre skolor i relation till folkskolans betygsättning*, Stockholm: Statens Offentliga Utredningar, No. 35, 1959.

Committee. Slightly more than half the pupils reached the leaving examination or were transferred to the Gymnasium within the normal number of years. More than one-fifth in the five-year and almost one-third in the four-year academic school were premature leavers. Since the pupils had been admitted on the basis of marks obtained in the elementary schools, Orring compared the performances in the secondary academic school with the initial standing on the basis of admission marks. If the receiving schools were able to judge who would be regarded as "academic material", and if the requirements were not raised during the course of the secondary school, one would expect the highest failure rate (leavers and grade repeaters) to take place in the first grade, whereafter only the subtle screening would remain. But the observed failure rates increase by grade. This would then indicate that the requirements are raised and that some sort of screening is regarded as part of the system or as a natural policy. In any case such a policy means not only that a great many pupils leave school without completing the course, which is in itself serious, but also, among those who leave or whose school life is lengthened due to grade-repeating, that there are many of high initial standing according to the assessments made by the elementary school. Even among those whose initial school marks were at the highest level, the failure rate amounted to more than 10 per cent in Orring's study.

The high failure rates in secondary academic schools in many countries imply a considerable loss of talent. A system in which at least a quarter of the pupils carefully selected for the lower section of the academic school drop out, while another 10 to 25 per cent repeat grades, must be judged to have failed in meeting its own objective of educating the high-quality pupils.[1]

THE EFFECT OF SEGREGATION UPON DEVELOPMENT OF INTELLECTUAL SKILLS

In many countries the attempts to establish a unified or comprehensive school covering the entire compulsory school age and providing general education for all children, irrespective of their later careers, are seen as an essential part of the democratisation process. The resistance to attempts to abandon the parallel system is based on certain institutionalised factors, of which congruence between the school organisation and the social class system is one. But the arguments against an integrated school with "undifferentiated" classes have mainly been pedagogical. Arguments in favour of an early organisational differentiation, i.e. a segregation of "academic" and "practical" pupils in different schools or different classes, are mainly the following: able children are bored and hampered by their less able classmates. The best intellects must be cultivated early if they are to develop. In heterogeneous classes, the teacher is compelled to neglect both the able and slow learners. A spirit of inquiry and intellectual discipline flowers only in academic types of classes. With early differentiation the road to the university will be shorter and less costly for the pupils with high scholastic ability.

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[1] See T. Husén, *supra* p. 124, footnote 1.

Unfortunately, very little research has been carried out to test the validity of some of these arguments. The research which has been conducted at the high school level in the United States is not very conclusive.[1] These studies mainly concern ability grouping within subjects, but research pertaining to homogeneous versus heterogeneous or to segregated versus integrated classes in all subjects, is almost completely lacking. A purely experimental approach would of course be the ideal in this connection. The pupils would then be assigned at random to different conditions or pedagogical milieux. Arrangements of that kind are, however, likely to meet resistance on the part of the parents. Parents of the able pupils would object to having their children assigned to heterogeneous classes and parents of less able children could be expected to object to having their children put in retarded classes.

At times, however, administrative decisions yield groupings which are not strictly random groupings but which exclude self-selection, thereby enabling the researcher to control more factors than is usually the case. An opportunity of this kind occurred in the school system of the city of Stockholm in 1954, when the City Council decided to introduce comprehensive schools in the southern part of the city and to retain the dual system in the northern section. An extensive range of intelligence, attainment and aptitude tests was given to the entire school population at the end of Grade 4, up to which everybody had had exactly the same kind of schooling (elementary school). School marks from Grade 4 and social background data were also collected. On the basis of school marks, a competitive selection for the first grade of the academic type of secondary school took place in the northern part of the city, while in the southern part, the children were kept together in the same class for at least two additional school years in the middle section of the comprehensive school.

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[1] See e.g. R. Ekström, *Experimental Studies of Homogeneous Grouping: A Review of Literature*, Princeton, New Jersey: Educational Testing Service, 1959.

The splitting up of the city provided us with a unique opportunity to study the effect of "creaming off" the most able pupils. We were not in a position to work with experimental and control groups in a strict sense but were able to control some factors by means of a covariance analysis. It was possible to compare the result of instruction in Grades 5 and 6 for three groups: first, the group of pupils selected for the academic secondary school after Grade 4 in the northern part of the city; secondly, the group of pupils in the southern part of the city with the same ability and social background who remained in the undifferentiated classes; thirdly, the children in the northern sector who were allocated to reorganised classes after the majority of the most able pupils had been transferred to the academic secondary school.

Since the majority of the children remain in school until the age of 16, which is the school-leaving age in the comprehensive system, it was possible to follow their progress for five years under quite different pedagogical conditions. The research design adopted and the technical procedures applied have been reported elsewhere,[1] and I shall not enlarge upon our methods of evaluating the results of instruction in different types of schools and classes or on how the analyses were made. Suffice it to say in this connection that we confined ourselves mainly to measuring certain basic intellectual skills, such as the ability to tackle new problems of the type the pupils face in taking intelligence tests, or for reading comprehension, spelling, various arithmetic skills, structure of the mother tongue and various aspects of mastering the first foreign language (English). It should also be mentioned that the evaluative instruments mostly used were those recommended by the school authorities.

If we kept only initial intelligence under consideration the pupils selected for academic schools tended to develop more favourably during the first two years than did those in the undifferentiated classes who, in their turn, were superior to pupils in classes thinned out by the removal of the majority of able pupils. But these differences almost disappeared when the social classes were considered separately. An important exception was the tendency for pupils in the lower social class to benefit more from a transfer to an academic secondary school than did children from the other two social classes. Thus, children from culturally less privileged homes responded more readily to the academic type of training at this age. Children from homes which are better off culturally, apparently receive a good deal of their intellectual stimulation outside the school. There seems to be no pedagogic advantage in grouping pupils of average and below-average ability, since the development of skills in children of comparable intelligence in such classes is less favourable than in undifferentiated classes.

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[1] T. Husén and N. E. Svensson, "Pedagogic Milieu and Development of Intellectual Skills", *School Review*, 1960, pp. 36–51.

These findings run counter to the opinion held by many educators, i.e. that it is the more able children who are especially hampered by being taught in undifferentiated classes. It is often asserted that an early transfer of pupils, who have given proof of high scholastic ability, to separate schools or classes is essential if they are to make the optimum educational progress. This alleged superiority of the selective type of pedagogic milieu is not strongly supported by the findings referred to here. From the point of view of intellectual development, there is at least no disadvantage for the pupils who come from the kind of homes that have hitherto in most European countries supplied the academic type of school with most of its pupils, to remain with their fellows up to the age of 13.

In the southern part of the city we had an opportunity to compare pupils who, after Grade 6, transferred to the academic secondary school with those of equal ability who remained in the comprehensive school.

The over-all results of these comparisons, which were made over a period of three school years, indicate that the differences are very slight if we keep not only initial ability but also social class under consideration. These findings suggest that "failure" to be admitted to the academic type of school has a greater effect when the transfer takes place early rather than late. Yates and Pidgeon[1] point out that a child who is capable of profiting from grammar school education, but for one reason or another is not admitted, tends to "adjust his rate of progress and modifies his attitudes and interests in conformity with the majority of his schoolfellows and may well, therefore, fail to manifest his promise when his case comes to be reviewed". In other words: those children who are capable but do not apply for competitions or do not succeed in the entrance examinations or the like, tend to "lay off". As has been seen, the difference between "academic" and "non-academic" is especially striking among children from the lower social classes.

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[1] *op. cit.*, p. 186.

Many teachers, at least in Sweden, complain of the lack of motivation among pupils in classes which have been "thinned out" by transferring the more able children to academic schools or classes.

CONCLUSIONS

If we want to "cater for the able", we are faced with the following problems as has been shown above:

1. Apart from the relative efficiency of various types of secondary schools, is it rational, if the optimum use is to be made of ability, for competitive selection for the university-preparing school to occur at the age of 10—13? To what extent is talent lost by the margin of error in the instruments used for selection, and what are the effects of social mechanism in this context?

2. To what extent is talent, especially for science and technology, lost as a result of the bias of the selection towards a linguistic or verbal type of education? This is especially important in small countries where modern languages, besides the classical ones, form an important part of the curriculum.

3. What price does the academic secondary school pay for the high intellectual standard of the small group which reaches the university after having been carefully screened throughout the school career? Is the loss of talent offset by the achievements of those who do succeed? Can we afford to have a system of rigorous selection when there is a constant shortage of highly trained personnel?

4. Are the alleged advantages of the academically talented pupils so great that their early separation from the rest of the pupils would be justified for purely pedagogical and economic reasons?

5. What are the relative merits of the selective and comprehensive systems in terms of the identification and promotion of ability? A comparison between the two systems must take into account not only those who reach the top of the educational ladder but also those who are left behind. Thus the needs for highly trained personnel in a society with an expanding economy must be considered.

CHAPTER 6

RESERVES OF ABILITY: SIZE AND DISTRIBUTION

P. de Wolff and K. Härnqvist

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P. DE WOLFF and K. HÄRNQVIST

The interest in higher education in modern society springs from two sources. One is of ethical origin and is related to the growing belief that every individual, regardless of his social status and origin, should be given equal opportunity for education up to the highest level. The other is economic and has its origin in the recognition that qualified manpower is a fundamental factor of production. Although it is true that an accumulation of physical capital is an indispensable condition for increasing prosperity, the development of more powerful capital goods and the complicated industrial organisation needed to make the most efficient use of them have raised requirements, both quantitatively and qualitatively, for qualified manpower of various types. Consequently, post-war economic development almost everywhere is connected with a high and increasing demand for scientific personnel. In the free countries of the Western world this demand is intensified by the necessity of keeping up with scientific and technical progress elsewhere. It is rightly felt that the competitive position may be hampered by the lack of adequately trained manpower.

Accelerated scientific and industrial development has already led to shortages of qualified manpower in many countries. This proves that the demand could not be met by the growing supply resulting from the increase in population, and in the number of people receiving higher education—in its turn determined by, among other things, measures taken to realize the ethical goal mentioned in the beginning. It must be admitted that shortages of qualified manpower are to be preferred to large surpluses, as was the case, for instance, in many countries during the great depression. Surpluses may prevent the realization of the ethical goal with its important social consequences on economic grounds.

However, there are serious problems connected with shortages too. It is quite probable that they have hampered a desirable expansion in the fields of research, production and social welfare. It is true that they have also stimulated governments, educational authorities, and even businessmen, to take a number of important steps. In many cases, existing training facilities have been extended, and additional schemes and continuation courses set up to train new candidates for leading functions and to improve the quality of those already employed in them.

Although these measures have, no doubt, helped to improve the situation, they are often too casual in character and, in the long run, many of them will remain of limited importance. Highly-qualified personnel, particularly those with academic training, need a long and well-balanced education. The continuously-increasing demand for this type of manpower can be satisfied in future only when the stream of students passing through the educational system is broadened as much as possible at the lowest stages, and when wastage is avoided as it advances.

Important results have been achieved in this direction too, although the effort may differ from country to country. Financial support to students has been considerably extended, and vocational guidance and information concerning existing training facilities have been improved. It is doubtful, however, whether these measures have met with sufficient response. Investigation in this field is very rare. Educational policy, so fundamentally important to future progress, is still to a large extent based on intuition and methods of trial and error. Such methods may be justified when an active policy for optimum participation in higher education is started, but may soon become inadequate when this action gains momentum.

It is believed in some circles that the educational level of the most advanced countries is already so high that no significant reserves of ability are still available, and that consequently the prevailing shortages can be reduced only by a structural change in the production system. The authors do not share this belief, and will give their reasons in section II, but would like to point out that even in countries where there are no doubts concerning the presence of reserves, the problem is not always adequately tackled.

As it is desirable on socio-ethical as well as economic grounds to use the available reserves of ability as fully as possible, any responsible educational policy will need to be based on a much better knowledge of the size and composition of these reserves of ability than now exists in many countries. Reliable estimates should be produced concerning the number of persons in different strata of the population who possess the capacity for continued education but are, in fact, prevented from participating in such forms of education by various circumstances. This information is a necessary background for any extension schemes for educational institutions of different types, as well as for a further improvement in vocational and study guidance, financial support at various levels, etc.

This knowledge should not only be considered as an indispensable tool for policy makers, but should also be used to influence public opinion and create a better understanding for the high and increasing toll on public means taken by education.

METHODS OF MEASURING RESERVES OF ABILITY AND THE RESULT OF THEIR APPLICATION TO PRACTICAL PROBLEMS

The objective formulated in section I can be realized only when adequate methods for measuring reserves of ability are available. This field has been studied intensively in recent years, and important methodological and practical results have been obtained. The authors, however, will not go into a detailed methodological discussion and will restrict themselves here to an outline of the results which are necessary for the understanding of their main theme, viz. the importance of the knowledge of reserves of ability for purposes of practical policy, dealt with in section III. A methodological discussion took place at The Hague Conference on Forecasting Manpower Needs, organised by OSTP in 1959, and was based on a paper prepared by one of the authors. For the convenience of those interested in the methodological aspects of the problem as well as in a description of the results obtained so far, a slightly revised version of this paper, enlarged by contributions from both authors, has been added as an appendix to this report.

The first measurements of reserves of ability led to the assessment of so-called "reserves in the narrow sense". Usually they were based on the distribution of ability either for the population as a whole or for certain age groups, as measured by I.Q. and/or similar prediction variables. From the corresponding distribution for a group of persons which had proved to be capable of a given type of education (secondary education, higher education, etc.) a minimum level of the variable required for such education could be obtained. The percentage of the original distribution above this level was considered as an indication of the size of the group capable of the type of education in question. By comparing this figure with the percentage actually participating, the reserve also could be estimated.

Reserves of ability in the narrow sense have the disadvantage of not leading to very reliable results. Ability for a given type of education is not effectively measured with the help of one variable such as I.Q. A whole complex of personality traits (perseverance, motivation, interest) is required. This is self-evident and is easily proved by the well-known fact that, even under very favourable environmental circumstances, persons with a sufficiently high I.Q. may fail. An important step forward was therefore taken when efforts were made to measure "reserves in the broad sense". As it is virtually impossible to measure directly all the factors pertaining to the complex of abilities required, a roundabout way had to be followed. The population was divided into a number of social strata and for each of these strata the distribution of a prediction variable (school-marks, I.Q., etc.) was studied in relation to the degree of participation in various types of education. Assuming that the environmental circumstances in the highest stratum would, for every value of the prediction variable, provide optimum conditions of development for each child according to its other traits and that consequently the maximum participation had already been reached (i.e. that no reserves were available), it was possible by means of comparison, to determine the reserves in the lower strata. As explained in the appendix, it is possible to distinguish even between reserves which can be tapped when certain obstacles related to the entrance to a given type of education are removed, and those which become available only when obstacles connected with the passage through the various stages of the education are reduced. In addition possibilities are opened up for measuring reserves of specialized abilities (e.g. for technical education, etc.).

Practical results have been obtained in only a limited number of cases; the most important one in Sweden, where an extensive investigation was made by one of the authors. Results are also available for the Netherlands where a rather simple approach had to be undertaken owing to lack of data. Apart from these two cases, the authors were able to derive some indications from material collected and published by others. They refer mainly to the United States and the United Kingdom (for a detailed description, see appendix to this chapter).

It is not possible to make a reliable comparison of the results obtained so far, the methods applied being too diverse. Nevertheless, it is interesting to note that they all point in the same direction, viz. that considerable reserves are still available at various levels in each of the countries under review. This is the more important as all these countries possess fairly advanced educational systems, notwithstanding considerable mutual differences. The authors therefore feel justified in supposing that the same will hold for almost all countries, and this explains the remark made in section I above.

This opinion need not conflict with the belief sometimes held in educational circles that even now a certain percentage of the students at institutes of higher learning lack sufficient ability, and that the effort spent on them is not justified by the results obtained. Apart from the fact that these difficulties may be due to a certain extent at least to deficiencies in the system and inherent in its selective character, the possibility should not be excluded that some strata have already been tapped too much while at the same time, others may still contain important reserves. They realize, however, that in such cases the assumption on which the reserve measurements are based, must be modified accordingly.

Finally, they want to emphasize that the identification and measurement of ability discussed here must be interpreted in a purely statistical sense. The fact that psychological testing may be applied in the basic investigations does not mean that they take the position that such techniques should be used for selection purposes in individual cases. This is an entirely different problem which need not be discussed in this connection.

THE IMPORTANCE OF IDENTIFYING AND MEASURING RESERVES OF ABILITY FOR POLICY PURPOSES

This section consists of two separate, although closely connected parts. An effort has been made in the first part to show how the identification and measuring of different types of reserves of ability can be of use for the formulation of a concrete educational policy. The second part deals with the importance of identification in general, and with the mobilization of the corresponding reserves.

The main reasons why we consider it important to measure reserves of ability for purposes of practical policy have been outlined in section I, and will now be elaborated. The importance does not lie so much in the availability of one overall figure (although even this may have some value) as in the various subdivisions that can be obtained from a sufficiently wide and well-designed investigation.

One of the most interesting of these subdivisions is the distribution of the total reserve in relation to level. In countries where school attendance is compulsory up to a certain age, as in most Western countries, losses at the primary school level are probably negligible. This may be quite different in countries with less-developed educational systems, but reserves at higher levels are no doubt present even among the pupils in the first-mentioned group. This is a generally accepted fact, but it is not always realized that the size of these reserves at the various levels must be known if an educational system is to make efficient use of all reserves and if wastage of ability is to be avoided as far as possible. This may be explained by the following example: It has been observed in the Netherlands that the percentage of secondary school graduates entering the universities and other institutes of higher education is nearly the same for all municipalities. Differences whether in location or in level of prosperity do not seem very important. The transition pattern from the primary to the secondary school (in particular to those schools preparing for higher education) on the other hand, still varies considerably. This suggests that the number of secondary school leavers who go on to higher education has already come close to its maximum value but that important reserves are still available among those who leave primary school. This theory still needs further investigation and, moreover, the example has deliberately been simplified; but if we accept it for the sake of argument, we are led to the conclusion that, in the long run, a much greater increase in the number of students may be expected from an effort to facilitate the transition from primary to (adequate) secondary schools than by concentrating mainly on removing obstacles at the entrance to the institutes of higher education themselves. It is evident that such a conclusion is of great importance to educational policy.

The example can be still further elaborated. The Swedish investigation mentioned in section II and described more fully in the appendix, shows that, for a given level of ability, the differences according to social strata are much larger at the stage of transition from one type of school to the next higher one than they are for the successful completion of the course at a given type of school. This is a very important conclusion since it leads to the supposition that the differences can more easily be eliminated in the first than in the second case. The obstacles encountered at the time of transition by children of the lower social strata can be reduced by financial support, better guidance, suitable propaganda, etc., whereas the others are due far more to environmental differences which are less easily influenced.

Obviously a clear understanding and assessment of these transitional differences is very important for the elaboration of a suitable policy to remove the obstacles referred to and to determine the financial and other aspects of the effort which is needed. Nevertheless, it still remains important to know the size of the reserves which depend on differences of the second kind, i.e. related to educational achievement. If adequate measures are taken it is to be expected that the transitional differences will gradually disappear and consequently a moment will come when the efficacy of a given effort can be increased by shifting the priority. Moreover, the social differences considered here depend on institutional and sociological factors which may differ from country to country. One should therefore not generalize too hastily on the Swedish results.

A second important distribution is the geographical one. In the Dutch example considerable regional differences in attendance at secondary schools were mentioned and corresponding reserves made plausible. What holds for a small country with a high density of population will also be true for large and less densely-populated areas. The large differences which can often be observed between urban and rural areas point to larger reserves in the latter than in the former. But again special research is needed to determine the size of these reserves. However, when reliable estimates are available they may play an important role in the design of the geographical pattern of the school system and in problems of choice, such as between increasing the number of schools of a given type or concentrating the pupils of a certain area in a restricted number of institutes (e.g. through adequate transportation facilities, financial support, etc.).

Thirdly, the differences in school attendance between the sexes should be mentioned. In many countries the male attendance rates at schools of different levels are considerably higher than the corresponding female rates. Consequently, one may expect large reserves of ability among women. The results obtained for the male population, however, cannot simply be transferred to the corresponding female groups, and a better quantitative knowledge remains indispensable for making more efficient use of these reserves.

Up to now reserves of ability have been differentiated only according to level. The above example, however, leads more or less automatically to the problem of specialized ability which is obviously of great importance in the cases previously mentioned. In recent years much attention has been focussed on the size of the pool of ability for the study of technology and the physical sciences. In this field the methodology has not yet reached the same level as in the measurement of reserves in general, although interesting results have already been obtained as may be shown again by the Swedish experience. Moreover, we should not endeavour to go too far in determining reserves of specialized ability. Aptitude for the study of science and technology on the one hand and for the liberal studies on the other may be sufficiently diverse for separate reserves to be computed, but even in this case the border line cannot be drawn very sharply. Needless to say, within each of these domains the degree of overlapping between the ability for different subjects of study will be much larger. Therefore, it is not reasonable to suppose that very precise estimates of reserves for, say, the study of mathematics will ever be possible. Nevertheless, it may be concluded that educational authorities in the formulation of their practical policy could derive much benefit from a knowledge of the size of available reserves broken down into the three or four variables mentioned, even when for each of these variables only two or at the most three different classes could be distinguished.

One should not expect too much from the study of the reserves of ability. It can lead to a quantitative conception of the total supply of ability at different levels and according to broad lines of specialization which will be effected in certain favourable circumstances. It cannot predict the exact professional structure which will result. The structure will and must depend on the force of the demand exerted by society during a given period. Consequently, reserve measurements cannot replace the forecasting of manpower needs; on the contrary, they must supplement it. When forecasts lead to a demand for abilities at a given level which cannot be met from the available reserves, it is evident that the supposed development which gave rise to this demand cannot be realized, and that the goals have therefore been set too high. If, however, total demand and supply are balanced but the students' preferences for specialization appear to lead to a different type of output from that which society will probably require, then it should be the task of the market forces to improve adaptation. This adaptation should preferably be supported by suitable guidance. Consideration of even more further-going measures (direct financial support, numerus clausus, etc.) will depend to a great extent on countries' attitudes to the degree of freedom of education.

A serious situation would arise if the development were to lead to a demand lower than the supply that can be produced. This would inevitably lead either to intellectual unemployment (or employment below capacity) or to a delay in achieving the aim of providing adequate educational facilities for everybody according to his abilities. The first case often occurs in underdeveloped countries where economic progress has not kept pace with the expansion of the educational system. The second case might occur in Western countries if economic development were to slow down. This explains the preference for shortages to surpluses mentioned in section I. Consequently, economic growth and the mobilization of ability are closely interwoven. An adequate supply of qualified manpower is a prerequisite for economic growth, but a satisfactory rate of mobilization will not be possible without a correspondingly high rate of growth.

When discussing the possibilities and limitations of the measurement of reserves of ability there is one important aspect which should not be forgotten. Education at all levels is increasingly financed from public means, and its share in public expenditure is already very considerable. In the long run, the mobilization of reserves will, no doubt, be regarded as a profitable investment, but initially it will require large sums of money and probably the burden of education on the State budget will have to be increased. Reserve measurements will not only yield the basic information; they will also supply the evidence necessary to make public opinion aware of the necessity and utility of this expenditure. This is a prerequisite for ensuring that adequate funds are raised in time.

CONCLUSIONS AND RECOMMENDATIONS

In the previous sections the authors have tried to accomplish two aims. In the first place, they intended to prove that measurements of the reserves of ability are possible with a degree of precision which make them useful for practical purposes. In the second place, they endeavoured to convey the idea that the knowledge of these reserves is an important tool in designing the expansion of the educational structure of a country.

At present this knowledge is available only in a very small number of countries, and even there the information is not at all sufficient for all practical purposes. They therefore feel fully justified in recommending Member countries to carry out investigations into the size and distribution of the reserves of ability.

It goes without saying that the value of the results of these studies would benefit very much from international comparability, while countries entering this field of research for the first time could profit considerably from the experience already gained by others. Consequently, it would be very important to establish international co-operation in order to improve and unify methods of assessing reserves of ability.

Finally, the authors would like to recommend educational authorities to be fully aware of existing reserves of ability and of the great social and economic interests that will be served by using them effectively.

THE ESTIMATION OF RESERVES OF ABILITY *

A. DEFINITIONS

Before embarking on a discussion of the methods so far used for estimating the size of intellectual resources, it is necessary to pay some attention to matters of definition.

First, it is important to distinguish between resources and reserves; "resources" referring to that part of a given population which according to a suitably chosen group of criteria is capable of following some well-defined type of continued education, and "reserves" to that fraction of the resources which does not actually receive the type of education under consideration. The two concepts are closely interconnected and, when one of them is known, the other can easily be derived.

Further, according to the Swedish psychologist Ekman,[1] reserves can, with the help of two dichotomies, be subdivided into four categories.

The first one refers to *reserves* in a *narrow* and in a *broad* sense. Reserves in a narrow sense are defined with respect to a single criterion, in most cases a measure of intelligence (e.g. the result of a test of mental ability). Reserves in a broad sense are defined with respect to the whole complex of psychological traits (perseverance, motivation, interest, etc.) required for successfully completing the type of education considered. For a given population and a given type of training the reserve in the broad sense obviously is smaller than the reserve in the narrow sense and forms only part of it. Moreover, it will be clear that the technical difficulties connected with the estimation according to the second definition (broad sense) are much greater than those inherent in the first one (narrow sense).

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* Sections A, B. 1–6 and C. 1–3 of this appendix are a slightly modified version of the technical parts of Professor de Wolff's paper "Intellectual Resources and the Growth of Higher Education", presented at the OSTP Conference on Forecasting Manpower Needs held in The Hague in 1959.

[1] G. Ekman, "Skolformer och begåvningsfördelning", *Pedagogisk Tidskrift*, No. 1–2, 1951.

The second dichotomy distinguishes between *actual* and *potential* reserves. Actual reserves are those present in a population at the age at which the continued education usually starts (e.g. the fraction of a group of army recruits capable either in the narrow sense or in the broad sense of following a university education).

Potential reserves refer to the corresponding group in the same population but at a much earlier date (e.g. at the end of the primary school).

If intelligence could be measured by so-called culture-free tests, the actual and potential reserves in the narrow sense based on such a test would be equal (apart from differences resulting from fall-out due to death, etc. during the period between the time points to which the reserves refer). As such tests probably do not exist, differences may be expected. This is particularly true for the corresponding reserves in the broad sense. As environmental influences will continue to work during the interval between the two measurements, considerable differences may occur, and one might probably expect the actual reserves to be smaller than the potential ones.

It is easy to understand that the potential reserves in the broad sense are the most interesting for practical work. An individual belonging to a reserve in the broad sense has a much higher chance of completing the corresponding education successfully than one belonging to the larger group of the reserve in the narrow sense. The validity of the first type of reserve therefore is much higher than that of the second. Moreover, it is much more important to identify the reserve at a sufficiently early stage to permit steps to be taken to prepare its members for the type of education to which the reserves refer. An actual reserve may contain a number of individuals lacking the necessary preparatory training notwithstanding the fact that they possess the mental abilities for higher education.

It would be desirable if distinction could be made not only between reserves for education at various levels (e.g. for secondary and higher education respectively or, under the American educational system, for colleges and universities respectively) but also between reserves for different types of education at the same level (e.g. mathematicians, lawyers and linguists at the university level). In this direction, however, little progress has been made so far.

The following sections will therefore be mainly dedicated to problems of reserves in general. Nevertheless the third method, which will be described in section B.8, also considers the problem of specialization.

B. METHODS OF MEASURING INTELLECTUAL RESERVES

1. *Introduction*

In the course of time various methods have been developed to measure intellectual reserves. Swedish investigators have played an important role in this field and made valuable methodological contributions as well as practical applications. Therefore sections B and C draw heavily upon their work although obviously other studies have been taken into account as well. The description does not, however, pretend to be complete. Often publications in this field are not easily accessible and important works might have been missed.

2. *The Method of Bounds*

Three methods will be described which may be considered as three consecutive phases of increasing perfection in approaching the problem. The first, which for brevity's sake will be called the *method of bounds,* is at the same time the oldest and that which so far has been applied in the greatest number of cases.

It is based on a very simple idea and can be applied when the distribution with respect to a *prediction variable* or *predictor* is known for the population one is interested in and for which the reserve (with respect to a given type of education) has to be determined. As prediction variable, either an intelligence quotient, or the result of a test such as G.A.C.T. (general army classification test) is chosen. Now a bound is fixed which is considered to be the lower bound of the prediction variable for that part of the population fitted for the given type of education. This lower bound is itself usually derived from a similar distribution for the group (or a sample of it) which already participates in the type of education under consideration (the population of reference). To take a typical case, the population may be an age group of army recruits for which the G.A.C.T. distribution is known. The type of education may be a university training. The lower bound has then to be derived from a distribution according to the same variable for students. From the distribution of the whole population and the lower bound the size of the intellectual resource can immediately be derived. When the percentage studying already at a university is known, the corresponding reserve can be computed too (neglecting, for the sake of simplicity, the small fraction of the actual students whose prediction variable is lower than the "lower" bound).

It is clear that the method of bounds can only estimate *a reserve in the narrow sense*. Therefore the disadvantages with respect to validity, which in general are connected with these methods, apply here too.

The method is not necessarily restricted to actual reserves, though it is mostly used for this purpose. One might, for example, assess the intelligence of children leaving the primary school and use the corresponding distribution for the computation of the reserve. If it were possible to design a culture-free test, one might even expect to find the same result both ways. In reality, however, this is not the case and, as has been pointed out already, considerable differences might occur.

Apart from these objections the method has a number of other serious drawbacks to which, among others, Ekman[1] and Quensel[2] have drawn attention.

In the first place, the lower bound which is the crux of the method cannot be fixed, without a certain arbitrariness. It is often chosen so as to cut off the lower 5 or 10 per cent of the population of reference but the choice is not very well argued. Sometimes one gets the impression that a higher percentage is chosen because it is felt that students at the lower end of the distribution will be successful only when all other circumstances are very favourable, hence an effort to approach an estimate in the broad sense.

Further, a difference between 5 and 10 per cent might seem to be modest. It corresponds, however, to roughly one-third of the standard deviation of the student population. Although this may correspond to a smaller fraction of the standard deviation of the population considered, the difference will have an appreciable effect on the final result.

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[1] G. Ekman, "Om uppskattningen av begåvningsreservens storlek" *Pedagogisk Tidskrift*, No. 7–8, 1949.

[2] C. E. Quensel, "Studenternas sociala rekrytering", *Statsvetenskaplig Tidskrift*, 1949, pp. 309–322.

Secondly, test results are due to measuring errors. As it is reasonable to suppose these errors to be independent of the correct value of the quantity to be measured, their variance simply adds up to the undisturbed variance of this quantity leading to an overestimate of this variance. This is true for the population considered as well as for the population of reference and will lead to overestimating the reserve too.

Finally, the test results are usually available only for samples, and therefore sampling errors also play a role. Their influence depends very much on the size of the sample. Unfortunately, however, the method is based on the value taken by a percentile at one of the flanks of a distribution, and the standard errors of these statistics are large and may for example, be easily twice the corresponding error of the mean. As the sampling errors are random ones, they may lead to either over or underestimates of the reserve.

3. *Methods to Measure Reserves in the Broad Sense*

The two remaining methods aim at an estimate of the reserve in the broad sense. Up to now, however, reliable methods to measure the whole complex of factors influencing the success of a higher education are not available and therefore a roundabout way had to be followed. Now it is a well-known fact that there are very large differences in degree of participation of the various social classes in continued education. This is true for secondary as well as for higher education. It is well known too that these differences, at least partly, are to be attributed to differences in mental abilities between the classes. Various investigations have been made on this point.[1] The differences, however, are so large that it is generally felt that other factors of economic and social origin are also at work. It is often assumed, in fact, that the most important reserves are to be found in the lower classes, among those who possess sufficiently high mental abilities for continued education. The experience in countries where the democratizing of education has gone farthest seems to confirm this conviction. In the higher classes, on the other hand, one might expect circumstances to be as favourable as possible for continued education and it is, therefore, reasonable to assume that the degree of participation observed in these classes represents the maximum which, given the available resources of mental abilities (in the broad sense), can be attained. This basic hypothesis seems also to have been formulated for the first time by Ekman.[1] It is the starting point of the two methods which will now be described.

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[1] T. Husén, *Begåvning och miljö*, Stockholm 1951, and *Begaafdheidsonderzoek en intelligentiespreiding*: *Deel II*, *Intelligentie en Arbeidspotentiee* Demologisch Instituut, 1957.

4. *The Method Developed at the Dutch Central Planning Bureau*

The second method has been worked out at the Central Planning Bureau of the Netherlands.[2] It is based on a simple combination of the first method and the hypothesis just mentioned. The more refined third method could not be applied in this case as the necessary data were lacking.

In the Netherlands the results of intelligence measurements of army recruits are available for a number of years. Five different tests are performed on each recruit (who has not been rejected as medically unfit). From this battery the results of the general test (Ravens' matrix test) have been chosen for the computation of the reserve. The test score runs from 1 to 6 and its distribution is known for the recruits grouped according to the profession of their fathers. From these data the corresponding distribution could be derived for the three broad social strata which are often used in Dutch cultural statistics. In particular it was possible to calculate the ratio of the number of recruits whose test score was above the midpoint of score class 5 to the total number of recruits for each of these strata. As the composition according to strata also could be determined for a one-year age group of the total population at the average university-entrance age, the absolute numbers of the test scores considered could also be computed and compared to the number of freshmen at the universities, a number which is also usually broken down according to social strata.

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[1] G. Ekman, *supra* p. 147., footnote 1.

[2] J. G. Spitz, "De reserve aan hoger intellect in Nederland", *Universiteit en Hogeschool*, December 1959.

The ratio found in this way is called *the relative coefficient of participation;* it increases very considerably from the lowest to the highest stratum.

Now, although it was realised very well that the score limit adopted is not a necessary prerequisite for university studies, and that among students a considerable number of lower scores will be found, the assumption was made that the ratio could be considered as a measure for the actual participation in higher education of a stratum in relation to its adequate intellectual resources. Consequently, in accordance with the basic hypothesis, the coefficient of the highest stratum was considered to be a maximum and, from the differences between this figure and the corresponding data for the two other strata, reserves could easily be computed. They can be characterized as *actual reserves in the broad sense*. The size of the reserves arrived at in this way evidently depend very much on the assumption made concerning the part of the differences which may be eliminated by suitable measures. In the study mentioned, two different assumptions are made, viz.:

a) the coefficients for the lower strata can be raised to the maximum attained in the highest one, and

b) these coefficients can both be raised to halfway between the actual coefficients for the highest and the middle stratum.

The second method is also open to the criticism that, in common with other methods based on what has been called here the basic hypothesis, it is only a working hypothesis. It is well known that the highest social stratum does not in any way consist of a homogeneous group. The participation in higher education among the children of academically-trained persons is usually considerably higher than among the offspring of other professionally occupied persons from the same stratum. The maximum is therefore at best a reasonable average.

Moreover, the critical remarks made with respect to the first method apply to some extent here too. The method is also based on test results, and the standard deviation of the distribution of the test scores will have been increased due to errors of measurement. A bound is applied here too, since a score above the midpoint of class 5 is considered as an indication of the size of the resources. A displacement of this bound, say to halfway score class 4, will influence the results. The effect, however, will be less serious than in the first case as the displacement will change the coefficients of participation in the same direction (although not in the same proportion).

Sampling errors are less important as the army tests are applied to a very large part of an age class of the male population. The rejection before testing of the medically unfit recruits will tend to overestimate the reserves, but only as far as rejection takes place for mental reasons. By far the greater part, however, is rejected on physical grounds and there are no reasons to suppose that their test score distribution will differ very much from that of the recruits passed.

Finally, the assumption has to be made that the test score distribution is the same for both sexes, as obviously only test results for men are available.

5. *Description of a Swedish Investigation*

The third method, as distinct from the preceding two, is not based on a method of bounds but on expectancy curves establishing a relation between the probability of participation in a form of higher education and a certain prediction variable. Such curves have been studied by various authors. Wolfle applies them, among others, to show that even very intelligent boys (with a very high A.G.C.T. score) still have a chance well below 1 to graduate from college.[1] He does not use them, however, to compute reserves of ability. This has been done by several Swedish investigators. The most recent application has been made by Härnqvist under the auspices of 1955 års Universitetsutredning (1955 Commission on Higher Education[2]). This study will be described here.

It is based on a 25 per cent sample of the pupils (appr. 10,000 in absolute figures) of the fourth form of the primary schools during the Spring of 1945. As prediction variable a weighted sum total was used of the marks in various subjects obtained by each pupil. The investigation was carried out in 1956-1957 and therefore the pupils could be followed up to an age of 20. Due to the excellent Swedish administration both with respect to educational institutes and population, it was not only possible to obtain the necessary school marks but also information concerning the educational "history" up to 1956 of a very large part of the elements of the sample. For 92.3 per cent complete information was available; 1.5 per cent of the fall-out was due to death and emigration and only for just over 6 per cent were data on marks or on the post-primary-school development lacking.

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[1] D. Wolfle, *America's Resources of Specialized Talent*, New York, 1954.

[2] *1955 års Universitetsutredning III*, *Reserverna för högre utbildning*, Stockholm, 1958.

As the probability for primary-school pupils to reach the university level (and in particular to choose the science line or the technical university) is very low, the basic material was increased by a 50 per cent sample of the pupils from the next highest form of the lower secondary schools ("realskolor") in 1948/49 (roughly the same age group as in the primary-school material).

Five different levels of education were distinguished, viz.:

0 primary school only,
1 lower continued education,
2 leaving certificate of the lower secondary school,
3 leaving certificate of the higher secondary school, the Gymnasium, (called "studentexamen"),
4 university attendance (inclusive of technical and other institutes of higher education).

(Cases of incomplete education, e.g. some years of Gymnasium without certificate, have been included at the next lower level; these fractions, however, were kept apart in the reserve computations based on the occupancy of the various levels.)

The whole material was divided into three social groups according to the fathers' profession, and based on a classification used in Swedish election statistics. (A breakdown into six types of municipalities was also made, taking into account the highest level of education locally available.) The two lower groups were taken together throughout, consequently only two strata were considered.

From the data various important results could be computed. In the first place it was possible to compute for each stratum, and within it for each class of the predictor (sum total of school marks), the fraction going to the lower secondary school. Such fractions can be interpreted as probabilities, and in this particular case, as *transition probabilities*. Considering these probabilities within a given stratum as a function of the predictor, an expectancy curve is obtained for the transition into that stratum. In the same way expectancy curves can be derived for the transition from the lower secondary school to the Gymnasium. It is also possible, however, to find curves for the probability of successfully completing a given type of education. These *completion probabilities* too can be represented as expectancy curves.

All the expectancy curves obtained show the same general pattern, viz. of the well-known sigmoid (S-shaped) curves. They differ very much, however, with respect to their central point (value of the predictor at the point of 50 per cent probability) and their slope.

It is very important to distinguish between transition and completion probabilities, as the two strata differ much more in respect to the first than to the second of these quantities. Particularly within the range of the medium values of the predictor are the deviations between the transition probabilities shown to be very strong. The differences in completion probabilities, on the other hand, are moderate, though not at all negligible. The conclusion seems to be valid therefore that, at a given (moderate) level of mental ability, the handicaps of the children of the lower social strata are much greater at the entrance than during the attendance at an institute of advanced education.

The distinction is also of great value for the computation itself of reserves. The factors responsible for the differences between the expectancy curves of the strata will be different for the phenomena of transition and of completion, so that consequently there may be differences in the possibility of eliminating their influence. For the purposes of reserve estimation Härnqvist, for instance, assumes that it will be possible (at least to a very large extent) to eliminate the differences in transition probability by removing the economic hindrances to advanced study and by introducing free admission to these studies. (At present, due among other things to shortage of adequate facilities, the leaving certificate of the adequate type of secondary education is not itself sufficient for admittance to the next higher stage. Usually additional requirements, e.g. sufficiently high marks in certain subjects, have to be met.) The differences in completion probabilities, on the other hand, mainly due to environmental influences (lack of assistance for study to pupils in the lower strata, lack of interest in the study itself, etc.) probably will not be eliminated this way.

Therefore, in order to determine the reserve, for example, in the group of children leaving the primary school and capable of obtaining the leaving certificate of a Gymnasium ("studentexamen"), Härnqvist computes a special expectancy curve for the lower stratum by taking the continued product of the probabilities for the transition from the primary and the lower secondary school and for the transition from this school to the Gymnasium, both derived from the data for the *higher stratum,* and the two corresponding completion probabilities derived from the data for the *lower stratum.* This expectancy curve is applied to the distribution of ability of the group of children leaving the primary school in the lower stratum. In this way the resource for the given level of education in this stratum is obtained. By deducting from it the number of pupils in the lower stratum who already obtain the leaving certificate, the total reserve can be computed.

Similarly, other reserves can also be determined. It will be clear that, in line with the terminology defined in section A, the reserves computed in this way have to be considered as *potential reserves in the broad sense.*

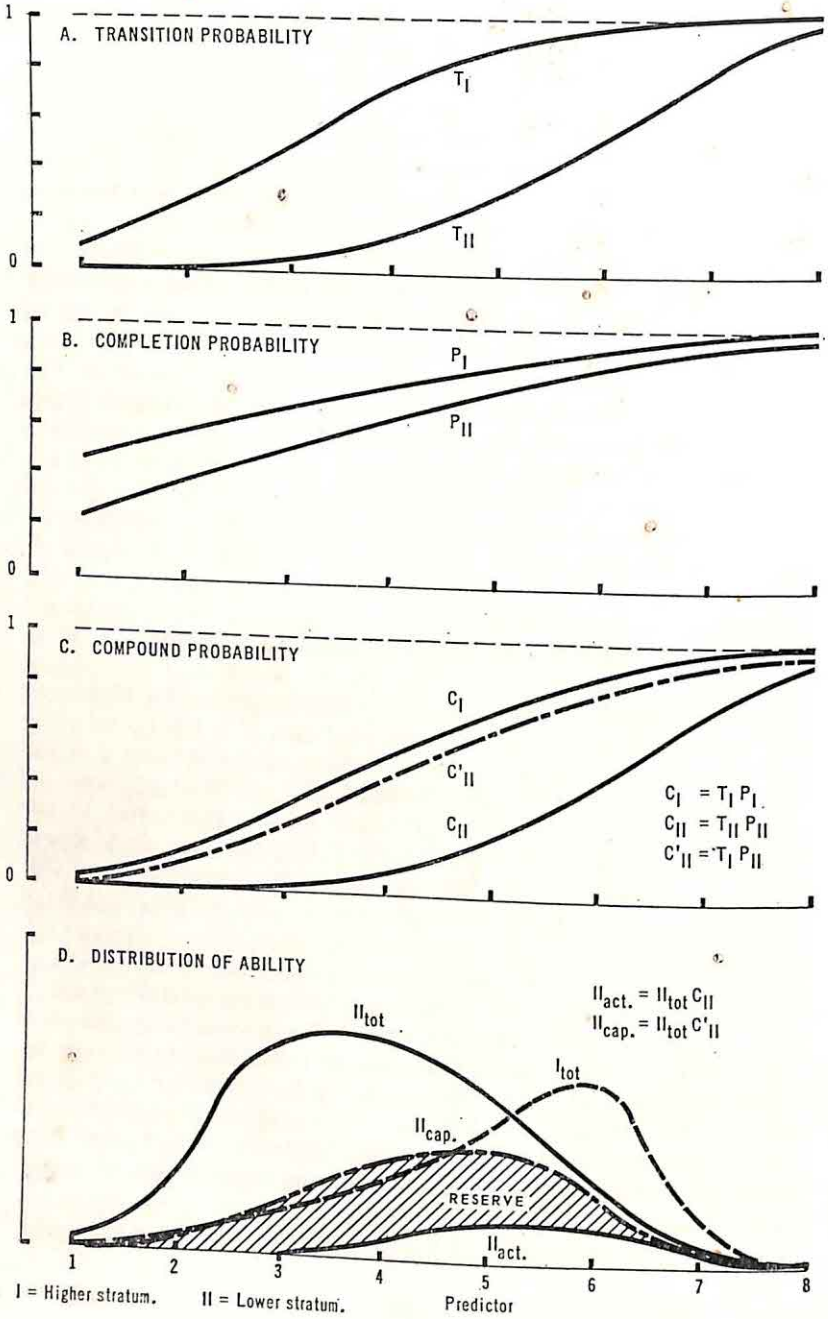
6. *The Principles Underlying the Swedish Investigation*

The general principle of the method applied by Härnqvist has been illustrated by the diagram on page 158, which refers to the determination of the reserve, among those leaving a lower type of school, capable of obtaining the leaving certificate of the next higher type. (The curves roughly correspond to the transition from the primary school to the lower secondary school in Sweden and to the completion of the latter one; the predictor in this case, as previously explained, is the weighted sum of marks.)

Part A shows the transition possibilities for the two strata, T_I and T_{II}. Part B shows the corresponding completion possibilities P_I and P_{II}. In accordance with what was actually observed T_I and T_{II} differ considerably, whereas the difference between P_I and P_{II} is much less. The compound probability for a pupil leaving the lower type of school to complete successfully the next higher type can be found (at each level of the predictor) by multiplying the corresponding transition and completion probabilities. Hence

$$C_I = T_I \cdot P_I$$

COMPUTATION OF INTELLECTUAL RESERVES



and

$$C_{II} = T_{II} \cdot P_{II}$$

According to the model described, the reserve in stratum II has to be computed from the transition probability for stratum I, i.e. T_I with the completion probability for stratum II, viz. P_{II}. Therefore the compound probability to be used in this case is shown by:

$$C'_{II} = T_I \cdot P_{II}$$

The compound probabilities derived from those shown in parts A and B are represented in part C. The reserve can finally be found by applying the difference in probability $C'_{II} - C_{II}$ to the distribution of ability (as expressed by the predictor in stratum II). This distribution $II_{tot.}$ has been indicated (together with the corresponding $I_{tot.}$) in part D of the diagram. In this same part curves have been drawn representing the distribution of those actually capable, viz.: $II_{act.} = II_{tot.} \cdot C_{II}$ and of those belonging to the resource $II_{cap.} = II_{tot.} \cdot C'_{II}$. The belt between these two curves corresponds to the *reserve available*.

The diagram can also be used as a tool in discussing some of the properties of the method. It has been assumed that free admission and removal of economic hindrances would eliminate the differences between T_I and T_{II}, whereas the differences between P_I and P_{II} would not be affected. It is possible, however, to make somewhat different assumptions, and to investigate their effect by the same general model. One might, for instance, expect that a more intense propaganda for advanced education among the lower social classes might even tend to decrease the differences between P_I and P_{II}, whereas, on the other hand, one might ask if it would be worthwhile to eliminate the economic hindrances (by an adequate system of loans and scholarships) for those who have such low intelligence that even the T_I, corresponding to their intelligence score, is still very low. Restriction of economic support to those who possess at least a minimum intelligence would cut off the reserve below this value (say the value 3 in the diagram) and would only to a small extent reduce the reserve computed without taking into account such restrictions. The assumption of a partial elimination of $P_I - P_{II}$ would, on the other hand, lead to a higher reserve. These examples will be sufficient to show the flexibility of the method.

It is interesting in this connection to note that the system of restricted admission applied in the Swedish educational system has some influence on the expectancy curves. Abolition of this system without any other change would tend to increase T_I, especially in the lower brackets of the predictor. It would, on the other hand, lead to a reduction of P_I since part of the selection process now taking place at the entrance would have to be carried out within the school itself. It has been assumed by Härnqvist that a change would not, however, affect the product $C_I = T_I \cdot P_I$.

7. *Criticisms of the Swedish Methods*

Quensel,[1] and also Härnqvist in a supplement to his study, have shown that the method used by the latter is sensitive to variations in the reliability and validity of the predictor. We shall now discuss how such variations influence the size of the estimated reserve.

Härnqvist uses school marks—the only type of variable available in his data—as predictors of success in higher education. According to Swedish experience, school marks are as good predictors as any other single variable, but usually a combination of school marks and intelligence tests makes better predictions than one of these variables separately. The validities of the two types of variables are usually of the same size, and the correlation between them about as high as the validity.

From the slope of the curve of transition probability for "studentexamen" in Härnqvist's study a biserial correlation between school marks and entrance into Gymnasium can be estimated according to a method developed by Härnqvist.[2] In the higher stratum this correlation is .55. Suppose now that the school marks are combined with a second predictor, e.g. an intelligence test, that has the same validity and a correlation of .55 also with the school marks. Then the validity of the combination can be proved to be .625. This value corresponds to a curve of transition probability with a steeper slope than the original one when both are plotted against standard units of the predictor.

The same operation can be performed for the curve of completion probability. For "studentexamen" this curve corresponds to a biserial correlation of .36 between school marks and success in the Gymnasium in the lower stratum. With an additional variable of the same validity and intercorrelation the combined correlation becomes .435. This gives a new and steeper slope of the curve of completion probability.

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[1] *Supra* p. 154, footnote 2.

[2] K. Härnqvist, "A Note on the Relation between 'Pass-fail' and Correlation Methods of Validation", *Reports from the Psychological Laboratory*, University of Stockholm, No. 42, 1957.

To calculate the new probabilities and to combine them into a compound expectancy curve it is, however, necessary to have not only the slope of the curve but also its central point (median). This means that we must be able to locate the new curves in relation to the new predictor. The simplest assumption is that the average individual now has the same probability as the average individual according to the original, single predictor. But this is not all self-evident, for an increase of validity should give a more valid location of the central point also.

If, however, in the absence of dependable information one makes this simple assumption, it normally leads to a decrease of the reserve estimates. In our example, locating the new compound expectancy curve in accordance with the old predictor mean, a reserve of 1,783 out of 9,448 persons as estimated earlier[1] decreases to 1,565.

The difference in the negative direction depends on the change of the expectancy curve. When the correlation gets higher the curve becomes steeper, and the midpoint around which it turns is fixed. Then the probability rises for groups with high values on the predictor but decreases for low values. As there are more persons belonging to the "low" than to the "high" predictor groups among those who have not received higher education, this change results in a diminishing reserve. We wish to point out, however, that the increase of validity also can bring about a change of the location of the curve that counterbalances the negative effects. Obviously, in all situations, estimates of reserves should be based on the best available set of predictor variables.

The same mechanism that has now been described as regards validity coefficients operates in respect of predictor reliability. When increasing the reliability of the predictor, the slope becomes steeper. As reliability refers to the random errors of measurement, which by definition have zero mean, an assumption of fixed location of the midpoint is quite legitimate. Therefore a more reliable predictor tends to give smaller reserve estimates. Calculations on the other hand show that, even with perfect validity and reliability and with the assumption of fixed central point, the reserves will be large. Better methods for dealing with the technical errors of estimation as now discussed would be valuable for refined calculations. For rough estimates, however, the present techniques give a sufficient degree of precision.

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[1] *Supra* p. 154, footnote 2.

8. *Extension of the Method with Regard to Reserves of Special Ability*

Special reserves, e.g. for technical and scientific education, form that part of the available pool of such ability which, under present conditions, is not utilized for education of the type concerned. The pool of special ability, however, can be defined in several ways. It can mean the number of those who would be able to profit—in this example—from technical and scientific education at a given level. Or it can mean the number of those who would profit *more* from such an education than from other types of education at the same level. Härnqvist in his study tries to estimate the number of those who would be likely to choose and to succeed in a technical education if they received the higher education for which they have the capacity.

The two first—and more clearcut—cases correspond to two types of prediction problems studied in connection with psychological testing. The first, where all those are included who have the capacity required for technical education, corresponds to "absolute prediction".[1]

The usefulness of *absolute* prediction depends on the validity of the predictor or combination of predictors. When trying to predict different criteria from the same set of predictor variables (multiple absolute prediction) the predictor variables are assigned different weights for different criteria. These weights depend on the correlations. When predicting a technical and scientific criterion it is likely that school marks in mathematics and science, scores in quantitative and mechanical comprehension tests, interest in technology and so on, get especially high weights. For other criteria other variables can be the best predictors, but usually some variables tend to be among the best ones for most criteria irrespective of the type of education concerned.

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[1] P. Horst, "A Technique for the Development of a Multiple Absolute Prediction Battery", *Psychological Monographs*, No. 390, 1955.

In Härnqvist's study, where only school marks were available, the marks in mathematics and science have a validity of .49 against a technical criterion. The marks in humanities have a validity of .36 against the same criterion. The correlation between the two groups of marks is .61. The partial correlation of the humanities marks with the technical criterion becomes .09, which means that this variable would make only a very slight contribution to a multiple correlation.

In *differential* prediction[1] the aim is to predict differences between a number of criteria for being able to assess that a person is likely to do better in one field than in others. Differential validity means that the validity of a predictor varies between different criteria. Such variations cannot exist if the intercorrelations between different predictors and between different criteria are high.

Empirical findings[2] show that most tests differentiate less between different criteria than could be expected. The validity of the tests tends to vary but little between the criteria of success in different fields. To some extent this depends on the intercorrelation of the predictors, but it can also be assumed that the correlation between the criteria is rather high. In most cases the latter correlation cannot be calculated as each individual does not participate in more than one or a few fields of study.

If a high correlation between the criteria is due to real overlap between the abilities required for successful study, there is no need for estimating special reserves for these fields: an individual who would succeed in one field would also do so in the others. If, on the other hand, the high intercorrelation to a considerable extent depends on spurious factors, for instance in judging success, the criteria should be revised. Also curricula or methods of instruction in different fields could be such as to favour general and verbal ability at the expense of specific talent. There is a tendency that educational institutions demand too much of the students in respect of general level of ability. This excludes some persons who possess the specific ability actually needed and puts an undue restriction on society's total pool of usable talent.[1]

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[1] P. Horst, "A Technique for the Development of a Differential Prediction Battery", *Psychological Monographs*, No. 380, 1954.

[2] P. E. Vernon, '*The Structure of Human Abilities*', London, 1950.

From this description it is evident that the research on special reserves, defined in different ways, is still at its beginning. Some results indicate that the ability required for success in many fields is fairly general, and then estimates of general educational reserves will do as well. On the other hand it is likely that the requirements for success could be developed in a more specific direction. In this case it would be possible to increase the available pool of talented manpower, and then estimates of special reserves too would be of great interest.

9. *The Method of Simultaneous Age-groups*

The method of assessing the educational reserves developed by Härnqvist has one serious drawback. It can be applied to the present reserves in a given country only when the country's demographic and educational administrations are of a very high standard. One must be able to construct from these sources the curricula up to the present moment of nearly 100 per cent of the elements of a sample drawn from the population attending a certain form of a given type of school 6 to 8 years ago. It is not very likely that this will be possible in more than a few countries. Another possibility, namely, to draw a sample from the population of the highest grade and to try to reconstruct its history back in time for a period of the same length seems to be still more difficult, as it will hardly be possible to cover the "drop-outs". Therefore in most cases the method can be applied to future reserves only, viz. by taking a sample from the present populations of the schools and following it through an appropriate period of time. This is a very unattractive procedure as 6 to 8 years are required to obtain results and the practical value of the method seems therefore to be rather low. The method can be modified, however, in such a way that these disadvantages are largely eliminated without seriously affecting the quality of the results.[2] In order to reach this goal the information which in the original methods was obtained by observing one single cohort during 6 to 8 years has to be derived from observing simultaneously 6 to 8 cohorts during one year. Consequently, sufficiently large samples have to be taken from the population of pupils of each of the consecutive grades under consideration. Each of these samples has to be split up into homogeneous groups according to social strata (profession of the father), age and sex of pupil, type of school, the prediction variable and possibly other relevant variables (e.g. the size of the family). For each of the sub-groups, annual completion probabilities can be computed. The completion probability for a longer period, e.g. for a given type of secondary school, can now be derived as the continuous product of the corresponding annual probabilities.[1]

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[1] D. Wolfle, "Diversity of Talent", *American Psychologist*, 1960, pp. 535–543.

[2] This idea has been suggested by one of the collaborators of the Netherlands' Central Planning Bureau.

The choice of the predictor to be used here needs closer consideration. The simplest case occurs when the same variable can be used for all cohorts, that is, a variable referring to the situation of the elements of the sample in the lowest grade taken into account (e.g. the school marks obtained in that grade). It is true that this presupposes the availability of school marks or similar data for periods six or eight years previously, but this seems to be less difficult than to follow a cohort administratively during a period of the same length. In this variant the essential advantage of using several cohorts is that information is obtained about the drop-outs.

If the reconstruction of the predictor is not possible, two ways are still open.

One is to use a special prediction variable for each cohort and to collect information about it at the beginning and at the end of the observation period. (Preferably this period should coincide with a schoolyear.) In this case the variable referring to the end of the year (which will act as the starting variable for the next higher cohort) has to be "translated" in terms of the corresponding one at the beginning of the year. As a high correlation between these variables is to be expected the linear regression relation between them will probably be sufficiently accurate for this purpose.

The second way is to use results of a psychological test as a uniform predictor for all cohorts. This variant is no doubt superior to the previous one but requires that a test be applied to all the elements of the sample, thus involving considerable expense.

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[1] In order to obtain the same level of precision, the annual samples have to be larger than the single sample on which Härnqvist's method can be based. This is necessary to compensate for the increase in the variance of the final probabilities when derived from the product of annual ones.

Clearly these variants of Härnqvist's method are based on the assumption that the annual completion probabilities for a certain type of pupil (characterized by social stratum, age, sex etc.) are constant over time. This assumption need not be true, but, when clearly marked trends occur, the results of both methods can be used for prediction only when a hypothesis with respect to the future course of these trends has been formulated. Those derived from the simultaneous method are then probably to be preferred to the results of the original arrangement. Moreover, the simultaneous method can be repeated much more easily. Such a repetition will yield extremely interesting results.

The method can still be varied in different ways. Instead of using as cohorts the populations of consecutive grades, one could choose age-groups and include the schooltype among the data to be collected. It seems possible even to replace the one-year period of observation by an examination at a given moment. The observation period has then to be replaced by a note of the pupil's "history" during the preceding year which will demand relatively little from the administrations. In this case, however, great care has to be taken not to miss the fall-out relative to a given type of education in the course of the year. For this variant the age-group approach seems to be particularly appropriate.

It is almost self-evident that even transition probabilities can be measured by the simultaneous method. All that is necessary is to choose the annual periods in such a way that the transition is included in at least one of the samples. As these transitions (in particular the transition from the primary to the secondary type of school) are of great importance for the problems of reserve, psychological tests might be included as additional information in the corresponding samples.

It is felt that the value of Härnqvist's method could be very much increased by the modification described above, and it would be highly desirable that its applicability be tested in a practical case.

C. RESULTS OF THE INVESTIGATIONS

1. *General Remarks*

The number of investigations into the size of intellectual resources is rather limited and, as has been explained in the previous sections, these investigations differ considerably from a methodological point of view. It is not surprising, therefore, that it is very difficult to find internationally comparable results. Consequently this section will be confined to a brief account of the studies available and to a few general remarks with respect to the results obtained. The investigations will be grouped according to the classification introduced in section B.

2. *Applications of the Methods of Bounds*

Three studies will be described using in one way or another the method of bounds. The first one is made by Grace Leyborne-White[1] and deals with the results from the progressive matrices test with 993 students at Manchester during the academic year 1945/46. From this investigation the I.Q. distribution of the students could be derived and, assuming these results to be representative of the university population as a whole in England, it was possible to estimate the fraction of the general population (of student age) inside the universities. The main findings are shown in Table I below.

TABLE I. PERCENTAGE OF THE POPULATION OF STUDENT AGE AT ENGLISH UNIVERSITIES

I.Q.	PERCENTAGE OF MANCHESTER STUDENTS AT OR ABOVE EACH I.Q. LEVEL	PERCENTAGE OF THE TOTAL POPULATION OF STUDENT AGE AT AND ABOVE EACH LEVEL OF INTELLIGENCE WHO ARE IN FACT STUDENTS AT THE UNIVERSITIES
135	19	25
130	31	29
125	47	20
120	66	14
115	82	10
110	93	7
105	98	5

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[1] Grace Leybourne-White, "The Intelligence of University Students" *Pilot Papers*, Vol. II, 1, March 1947, p. 69.

From this table it is immediately clear that (at least in 1945/1946) only a moderate fraction of the most intelligent part of the population was inside the universities. The author states that it was generally accepted that university education was appropriate for I.Q.'s of at least 120. Above this level no more than $^{2}/_{3}$ of the students were to be found, but only $^{1}/_{7}$ of the total population meeting this requirement was inside the universities. Even allowing for very substantial numbers of those who have not the interest or who lack other qualities necessary in the student, and of those who in the prevailing circumstances secured their higher education elsewhere, the author concludes that there remains a large body for whom provision should be made at the universities.

Secondly, some attention will be given to the work of Husén, who has made several studies of the data available as a result of experimental work on Swedish army recruits. Here, a few typical results will be presented from the publication already mentioned.[1] In this case the 1945 and 1946 conscripts were studied with respect to intelligence (based on a series of some 6 tests). The material was subject to the same types of imperfection as those mentioned in connection with the Dutch investigation (in section B.4), namely, the mentally unfit were not included, a small number was missed due to special regulations, etc. Those rejected on physical grounds, however, have been included. The whole group tested included roughly 40,000 individuals. The material has been analysed according to intelligence, level of education and the character of the municipality of residence.

Actual reserves in the narrow sense have been computed by determining the fractions for those who stopped at a certain level of education, but whose I.Q. surpassed a specified level considered to be appropriate for a given type of continued education. These latter levels have been derived from the I.Q. distribution of those who had actually received this type of education. It was put equal to the lowest decile of this distribution.

The results for those who did not receive any education after the primary school are given in Table II on page 169. For the whole group of inspected recruits the corresponding total figures for the four columns are 51, 32, 22 and 12.

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[1] T. Husén, *op. cit.*

From these results it can be seen that at the lowest level there are still definite reserves for a much higher education. Marked differences, however, exist with respect to the size of the municipality.

It is interesting to observe that Husén has not used his material for the estimation of reserves in the broad sense although, in another part of the study referred to, he manipulates the breakdown according to the profession of the fathers of the recruits.

TABLE II. PERCENTAGE OF 1945/46 SWEDISH ARMY RECRUITS WITH PRIMARY SCHOOL ONLY BUT WITH SUFFICIENT I.Q. FOR SECONDARY SCHOOL EDUCATION OF A GIVEN TYPE

TYPE OF MUNICIPALITY	PERCENTAGE OF THOSE HAVING PRIMARY SCHOOL ONLY AND WHOSE I.Q. IS ABOVE THE LOWEST DECILE FOR			
	LOWER SECONDARY SCHOOLS		GYMNASIUM	
	WITHOUT EXAMINATION	WITH EXAMINATION	WITHOUT EXAMINATION	WITH EXAMINATION*
Big cities	49	29	17	6
Other cities	39	23	12	4
Villages	44	21	10	—
Rural districts	44	14	8	3
Total	40	19	10	4

* The so-called "studentexamen".

A third author whose work may be cited in this respect is Wolfle. In his publication mentioned before,[1] which is the report of the Commission of Human Resources and Advanced Training (appointed by the Conference Board of Associated Research Councils), he deals extensively with the results of an investigation into the further education of those leaving high school. Two prediction variables are used by him, viz. the intelligence measured with the G.A.C.T. and the grades obtained in high school. As a typical result of his work Table III on page 170 may be cited.

These results, too, point to considerable reserves. Even if the level of ability is restricted to that which is attained by only 27 per cent of the college graduates, only 42 per cent of this category actually goes to college. If non-high school graduates of comparable intelligence are taken into account, the percentage drops to 38. Now a level corresponding to 27 per cent of the top ranking graduates imposes very high requirements and lowering it to more normal values will obviously decrease the ratio.

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[1] D. Wolfle, *op. cit.*

TABLE III. POSSIBLE COLLEGE SELECTION LEVELS AMONG HIGH SCHOOL GRADUATES, AND EDUCATIONAL ATTAINMENT OF PERSONS ATTAINING THOSE LEVELS

SELECTED UPPER PERCENTAGE OF HIGH SCHOOL GRADUATES AND GRADES AND INTELLIGENCE TEST SCORES OF THE SELECTED GROUP		PERCENTAGE AND NUMBER WHO LATER GRADUATE FROM COLLEGE		NUMBER NOT GRADUATING FROM COLLEGE	ADDITIONAL NON-HIGH SCHOOL GRADUATES OF COMPARABLE INTELLIGENCE
		%	NUMBER		
Top 2 %.	Intelligence in top 2 % and grades in top 20 % of all high school graduates	62	15,000	9,000	300
Top 7 %.	Intelligence in top 8 % and grades in top 40 % of all high school graduates	54	47,000	40,000	1,700
Top 16 %.	Intelligence in top 20 % and grades in top 40 % of all high school graduates	47	96,000	106,000	9,000
Top 27 %.	Intelligence in top 39 % and grades in top 40 % of all high school graduates	42	144,000	198,000	41,000
Top 35 %.	Intelligence in top 61 % and grades in top 40 % of all high school graduates	38	172,000	274,000	128,000
Top 48 %.	Intelligence in top 61 % and grades in top 60 % of all high school graduates	34	208,000	403,000	128,000

3. *Estimates of Reserves in the Broad Sense*

a) *The Results of the Dutch Study*

The second method described in section B is represented by one investigation only, the Dutch study mentioned in B.4. It has already been described and it will therefore be sufficient to mention here only a few of the results, which have been summarized in Table IV as follows.

TABLE IV. PERCENTAGE OF AN AVERAGE GENERATION WITHIN UNIVERSITIES AND OTHER INSTITUTES OF HIGHER EDUCATION IN THE NETHERLANDS

STRATUM	ACTUAL SITUATION			POTENTIAL SITUATION ACCORDING TO					
				ASSUMPTION I			ASSUMPTION II		
	Men	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*
Highest	25.6	9.7	17.7	25.6	9.7	17.7	25.6	9.7	17.7
Middle	4.9	0.8	2.9	9.9	3.0	6.5	9.9	2.3	6.2
Lowest	0.7	0.06	0.4	5.3	1.6	3.5	5.3	1.1	3.3
Total	3.9	1.0	2.5	8.5	2.7	5.6	8.5	2.2	5.4

Assumption I corresponds to the alternative (*b*) in section B.4 [alternative (*a*) seems to be somewhat unrealistic] and, according to it 5.6 per cent of each generation seems to be able to enter the university. Even this assumption is unrealistic in one respect. Increasing the coefficient of participation of the lower strata to halfway between the values of two higher strata for both sexes leads to a greater increase in the number of women than men. As the sex ratio at the universities has been practically constant since the war (approx. 4 : 1), such an increase does not seem very probable. Assumption II has therefore been made, according to which the sex ratio will remain constant. This obviously leads to a lower figure, which nevertheless is still twice as high as the prevailing one.

The results prove, among other things, that considerably bigger reserves could be tapped by a policy of strongly promoting female participation in higher education. This again shows that the size of the reserve depends on the social policy adopted.

b) *The Results of the Swedish Study*

The methodological aspects of the Swedish study have been described in some detail in B.5.[1] Its most important results are brought together in Table V as below. It gives a clear picture of the present situation as well as of the reserves according to the computations made. No fewer than 51.4 per cent are considered to be capable of the examination of the lower secondary school, 8.2 + 4.1 + 15.5 = 27.8 per cent of the examination of the Gymnasium, which is three times as much as the number graduating at the time that the study was done.

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[1] Cf., *supra* p. 154, footnote 2.

TABLE V. ABILITY OF A SCHOOL GENERATION IN SWEDEN ACCORDING TO HÄRNQVIST ESTIMATES

	PERCENTAGES OF A GENERATION	
1	with leaving certificate of a Gymnasium ("studentexamen")	8.2
2	with leaving certificate of a lower secondary school ("realexamen") but capable of "studentexamen" ...	4.1
3	without lower secondary education but capable of "studentexamen"	15.5
4	with "realexamen" but not capable of "studentexamen"	6.5
5	without lower secondary education but capable of "realexamen"................................	17.1
6	not capable of "realexamen"......................	48.6
		100.0

These figures are rather high, especially when compared with the results of the Dutch investigation mentioned before. Two facts have to be taken into account, however. First, in the Swedish data mentioned above, the reserves among women are calculated on the basis of the same probabilities as for men, which has been assumed to be not realistic in the Dutch case. It is therefore more correct to compare the Dutch figures for men with the Swedish general results. Moreover, the previous data refer to the number of students at the universities which, at least in the Netherlands, makes a difference of a factor ½. But even with these corrections the Swedish figures are still higher than the Dutch. This may be due to differences in methods of investigation and shows the need for internationally comparable results.

Finally, with respect to reserves of scientific and technical manpower at the university level, the actual figure in Sweden is already 2.5 per cent of a generation. According to the computations a doubling seems to be possible here.

c) *Some Results Derived from the Crowther Report*

The only study available so far which is comparable in scope to the work done in Sweden, is the so-called National Service Survey for England and Wales. A representative group of Army recruits during the period August 1956—August 1957, mostly 18 to 21 years old, were studied in respect of ability (tested at enlistment), educational level, and parental occupation.[1] Even if this group is not strictly representative of the whole male population, the data could be used for an approximate estimation of *actual* reserves of talent according to Ekman's terminology.

Of the total sample of 5,921 recruits, 11.7 per cent have parents in the professional and managerial group. This group can be taken as the higher social stratum from which compound probabilities of success at different ability levels can be calculated. (The data do not permit distinction to be made between transition and completion probabilities.)

In Table VI below we have put together the educational levels from two or more passes at General Certificate of Education Advanced level[2] and upward to form the group that has succeeded in higher education.

TABLE VI. PERCENTAGE OF RECRUITS WITH GCE(A) AND UPWARD ACCORDING TO ABILITY AND STRATUM

STRATUM	ABILITY GROUP				
	1	2	3	4	5
Higher	68.0	18.8	5.0	—	(8.3)
Lower	44.3	7.2	1.5	0.4	—

If we put also men with four or more passes at General Certificate of Education Ordinary level[3] in the group with higher education, we get the percentages shown in the following table (Table VII).

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[1] '*Report of the Central Advisory Council for Education*' (England) ("The Crowther Report"), 1960, Vol. II, p. 122.

[2] General Certificate of Education at Ordinary level [GCE(O)] is an external examination customarily taken at the age of 16 after five years in grammar school. It can be taken in any number of subjects but grammar school pupils usually take from four to nine subjects. General Certificate of Education at Advanced level [GCE(A)] is taken after two to three more years of study, and usually in two to four closely related subjects. GCE(A) qualifies for university entrance.

[3] *Supra* footnote 2.

TABLE VII. PERCENTAGE OF RECRUITS WITH GCE(O) AND UPWARD ACCORDING TO ABILITY AND STRATUM

STRATUM	ABILITY GROUP				
	1	2	3	4	5
Higher	95.3	52.5	20.0	—	(8.3)
Lower	77.7	21.8	5.7	1.5	0.3

As estimates of the probability of success in higher education we now use the percentages from the higher stratum as shown in Table VIII below.

TABLE VIII. ESTIMATED PROBABILITY OF SUCCESS IN HIGHER EDUCATION ACCORDING TO ABILITY (FOR TWO DIFFERENT LEVELS OF REQUIREMENT)

	ABILITY GROUP				
	1	2	3	4	5
For 2+passes at GCE(A) and higher	68	19	—	—	—
For 4+ passes at GCE(O) and higher	95	52	20	—	—

Ability levels with probabilities under 15 are excluded. Using the probabilities on the groups of the lower stratum which have not received higher education we get the distribution of the whole sample as to capacity for higher education (see Table IX on page 175).

GCE(A) here means two or more passes at Advanced level. GCE(O) means four or more passes at Ordinary level.

Thus, according to this estimation the percentage of GCE(A) could be raised from 9 to 16 and the percentage of GCE(O) from 8 to 18, which indicates that there are sizeable reserves of talent.

The results resemble very much those of Husén who, with the method of limits, estimated *actual* reserves from Swedish National Service statistics. The reserves are smaller than those found by Härnqvist who studied *potential* reserves, which is in accordance with expectations.

TABLE IX. ABILITY OF A GENERATION OF ARMY RECRUITS IN ENGLAND AND WALES ACCORDING TO THE NATIONAL SERVICE SURVEY

	NUMBER OF MEN	%	
Received GCE(A) or higher	554	9.4	16.6 GCE(A)
Received GCE(O), capable of GCE(A)	135	2.3	
Not received GCE(O), capable of GCE(A)	290	4.9	
Received GCE(O), not capable of GCE(A)	463	7.8	18.0 GCE(O)
Not received GCE(O), capable of GCE(O)	601	10.2	
Not received GCE(O), not capable of GCE(O)	3,878	65.4	
	5,921	100.0	

D. Conclusions

The preceding methodological considerations show that the problem of estimating reserves of ability is still in a phase of rapid development. Several methods, in particular among the more refined ones, have been applied in only one or two cases. Moreover, suggestions to improve the techniques have been formulated which so far have never been tested in practice. The data on which the investigations had to be based were not always sufficiently extensive and reliable. Sometimes, even, data had to be used which had not been collected for the purpose of assessing reserves of ability. Consequently, it is evident that important progress is still possible, especially with respect to the data, the international comparability of the results, etc.

Nevertheless, the experience gained so far seems to justify the conclusion that the techniques already available, provided they are applied with great care and critical sense, are sufficiently developed to yield results of great practical value to policy makers.

The quantitative results described in section C, although differing, all point to the same conclusion—that considerable reserves of ability are available in each of the cases reviewed.

CHAPTER 7

A

A NOTE ON COMPARATIVE STATISTICS

John Vaizey

B

SOME COMPARATIVE EDUCATIONAL STATISTICS

Prepared by the Secretariat of O.E.E.C.

CHAPTER 7

A. A NOTE ON COMPARATIVE STATISTICS

John VAIZEY

The statistics in Part B of this chapter are subject to major limitations and therefore should not be interpreted too closely. It is better to make international comparisons of broad categories in order to sort out those countries that are at either extreme, rather than to make a narrow division between countries which are fairly close together. For this reason, among others, I think that only two significant conclusions could in fact be drawn from Table I. The first is the rapid rate of attenuation of school populations in Europe between the ages of 15 and 18, and the second is that this rate of attenuation is particularly strongly marked for girls compared with boys.

On Table II there arises one of the major difficulties in international comparisons of this sort: that the age of starting school varies from country to country, and so does the age at which children may leave school. Therefore, in the column marked 5 to 14, it will be seen that the United Kingdom has a very high percentage at school. This is purely because the United Kingdom's age of compulsory attendance is 5 to 15; and other countries, like Iceland, seem to compare particularly badly, because their age of entry to schools is higher, and so is their age of leaving. The significant comparison to make would be to combine the first two columns and to take the age group 5 to 19. On this basis an index may be made, taking Canada and the United States as 100, and ranking other countries accordingly. There are a number of countries right at the top, Canada and the United States, then Iceland at 95, and then the next broad category of countries is Belgium, France, the Netherlands, Norway, Sweden and the United Kingdom at 90 or so; and below them another category of countries—Austria, Denmark, Germany, Greece, Ireland, Italy, Switzerland and Luxembourg at about 80. What immediately comes out of this is that there is some correlation between national income per head and the level of educational opportunity. It is not a close correlation, because some countries with a very high standard of national income per head appear in the fourth category, while others with a fairly low national income per head appear higher up or in the same category.

A substantial point arises from the point of view of access to higher education. If we take the United Kingdom, it has of all Western European countries the longest period of compulsory schooling—ten years. Yet it also has one of the lowest rates of enrolment in higher education. In the United Kingdom the age of starting school is 5 years; in most other countries it is 6 years or 7 years. Now it seems to be a question of fact (which can be answered by psychologists and pedagogues) as to whether a child between the age of 5 and 15 learns as much, or more, or less, than a child between the ages of 7 and 17. Since the age of schooling from 5 to 15 takes as many teachers as the period of schooling from 7 to 17, it is important to know whether the consequences of this period of education are more or less effective. One thing we *can* say in the absence of such research; by starting school so young and leaving it so young, the United Kingdom unduly handicaps itself from the point of view of putting people forward for access to higher education. The United States, which starts and ends school later than the United Kingdom, has a much closer relationship between the secondary schools and higher education, whereas—apart from the select academic stream—there is in the United Kingdom a gap of three years between the schools and higher education.

If we look more closely at some of the figures in Table II, another general conclusion can be drawn. There is a broad range of countries, United Kingdom, Sweden, Canada and the United States, which have been aiming at ten year schooling for most of their children, while, on the other hand, there is a broad range of countries which have been aiming at giving a high proportion of their population access to higher education: France, Iceland, The Netherlands, Norway, Sweden, Switzerland, Canada, the United States. These two categories of countries are not identical, but they overlap significantly; and it seems that a logical corollary of extending the average school life is a much broader access to higher education. This may seem a truism but it is one not yet widely translated into educational policy.

Table III, which has to do with the number of graduates in general secondary education in relation to population age 19, is subject to very serious limitations. It indicates variations, for example, in the amount of education given to girls and to the population as a whole, but the significance of graduation from secondary education also varies enormously from country to country. There is a broad difference between the use of these figures as an index of high school completion—in the American sense—and, alternatively, as a measure of the proportion qualifying for higher education; and necessarily, the second measure in such statistics will seem less creditable than the first. Therefore, except in so far as this indicates the number of people who are available for higher education, it is doubtful whether comparisons between countries on this basis are very significant, particularly as the age of termination of secondary education varies substantially from country to country—between the ages of 17 and 20.

In Table IV—which is concerned with the number of first enrolments in institutions of higher education and first enrolments in science—we have to be particularly careful because there are a number of questionable implications behind the way in which the figures are presented. In the first place, few of the statistics make any allowances for part-time education. A number of countries, including Germany and the United Kingdom, devote considerable expenditure and effort to part-time education. It does seem a matter which could be profitably discussed whether in fact part-time education makes as efficient a use of talent as full-time education. Investigations have shown (in particular the work of Sir Geoffrey Crowther's Advisory Committee in England) that part-time education in so far as it prepares people for qualifications, is wasteful and is expensive. Table IV implies this point of view by excluding part-time education, and it could profitably be discussed whether it is in fact peculiar to the English organisation of part-time education that it is so ineffective, or whether there are half-way houses between the English system and full-time education which are effective. Secondly, this table omits correspondence courses which are widely used in countries with substantial rural populations and scattered populations.

Above all, there is a problem about the definition of institutions of higher education. But having said that international comparisons are more often than not comparisons of the definition of higher education rather than of the rate of enrolment, a general point could be made. Throughout Europe an enrolment ratio of about 4 per cent of the relevant age group (in the late 1950's) in higher education was a fairly typical figure, but a number of countries had very considerably exceeded this proportion: Belgium, France, Sweden, and, of course, the United States and Canada presented a completely different picture. It will be noted that Belgium and France are not the countries in Europe which approximate most closely to Canadian and United States standards of living, systems of economic organisation, or patterns of industrialization. The fact that Belgium and France have deviated from the European average is due to social and educational factors in those countries and not to their approximating to the American pattern of economy. This again is an important point, because it breaks the close connection between economics and the educational system which is commonly assumed to exist.

The comments which I have made about Table IV, apply, *a fortiori,* to Table V. A university is not an agreed international concept covering one meaningful definition of higher education. For example, the Irish figure of enrolment is particularly high compared with the figure for the United Kingdom; but we have to make allowance for the fact, that in Ireland the age of entry is lower than it is in the United Kingdom, that access is much more completely open to all those with qualifications, that pupil/teacher ratios in the United Kingdom are more favourable and that the failure rate in Ireland is higher. Therefore, in making these comparisons we must compare the total educational situation rather than just compare simple statistics, baldly presented. Nevertheless, we could go still further and compare the number of degrees given by different countries with the number of enrolments. This yields quite a different pattern. Thus, in the United Kingdom in 1957/8 there were more first degrees than in France or Sweden, where there was a very much higher rate of enrolment in universities, because wastage rates in France or Sweden are higher than British wastage rates. The question therefore arises as to whether it is more useful to give access to a much wider range of the population and then, once they are in the university, to allow them to drop away, or to make an exceedingly careful choice, and having made that choice to do all that can be done to retain the maximum number of students until the end of the course. There are two models which could be followed and it is open to serious investigation as to which is the more effective way of organising university systems from the point of view of developing talent, and making sure that all possible talent is given the opportunity of higher education.

The table also deals with degrees in natural sciences, engineering and other similar courses. It is true to say that generally the rate of enrolment varies between a quarter and a third, going up to 39 per cent in the Netherlands. Obviously the rate of enrolment in science and engineering is more highly correlated with the degree of industrialization than any other educational statistic, so that while it would be untrue to say that the rate of enrolment is directly related to the economy, the balance of curriculum within the universities is fairly closely connected with the level of economic development.

The limitations of the statistics are great, and it seems to me that international comparisons of education are extremely dubious unless they are carried out with great care and by a detailed comparison of the structure of education, its place in society and in the economy. Nevertheless, it seems that the differences which are shown in the statistics between certain countries are so striking that they must indicate something. They indicate in a number of countries a serious unbalance in their educational provision. Moreover, the quality of education obviously varies substantially from country to country. It is one's impression that the *studentexamen* in Sweden, for example, approximates in intellectual level (although not necessarily in the contents of subjects) to the standard of two A levels in Britain. Is it possible to develop a system of comparison of international qualifications which will enable a much closer comparison of the rate of output of qualified people in different countries to be made? People will say that education in each country is so idiosyncratic, so peculiar to that country, that these comparisons are always subject to major qualifications. Nevertheless, the fact remains that doctors, engineers and people of high professional skill are allowed to practise in foreign countries, that their qualifications are approximated, and it seems to me that more comparisons of this sort would enable valid judgments to be made. Two other points are important. First, that in all the statistics, with the possible exception of the United States, women are seen to be at a very serious disadvantage as compared with men, and secondly that in all the statistics, people from lower socio-economic groups and people from rural backgrounds are very seriously handicapped compared with people from high socio-economic groups, and people from the towns; and therefore, highly industrialised countries where the distribution of income is equal and where sex equality has been a doctrine in practice for a number of years, are far more likely to throw up more talent than countries where this is not the case. I would think that this is a sociological proposition which is almost incontrovertible.

My comments on the statistics constitute a criticism of the national statistical bodies responsible for education. It is almost inconceivable that any other sphere of such importance in social, economic and cultural life should be so badly documented as education is in almost every country—with certain honourable exceptions; and I think that if one of the consequences of this and other meetings were to be a substantial improvement in educational statistics, a great deal of our thinking would be much clearer and a great deal of the debate which at present takes place, would be seen to be completely abortive and irrelevant because it is based on false premises.

B

SOME COMPARATIVE EDUCATIONAL STATISTICS

Prepared by the Secretariat of O.E.E.C.

TABLE I. SELECTED O.E.E.C. COUNTRIES

ENROLMENT RATIOS BY YEAR OF AGE AND BY SEX, FOR ALL TYPES OF EDUCATION[1]

AGE	BELGIUM[2]			FRANCE[3]			GERMANY[3 4]			NETHERLANDS[3]			NORWAY[2]			UNITED KINGDOM[2 5]		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
10–14	93.21	91.52	92.41	94.5	96.0	95.2	94.3	94.30	94.3	93.57	93.84	93.70	96.22	97.68	96.93	97.90	98.35	98.12
15	57.25	52.51	54.93	50.6	56.8	53.7	51.39	52.40	51.9	73.62	54.88	64.50	57.60	58.70	58.14	41.22	36.81	39.06
16	45.97	38.39	42.23	42.0	46.0	43.9	41.53	39.86	40.7	64.94	39.77	52.69	53.88	46.19	49.65	28.29	21.53	24.97
17	34.34	24.95	29.70	27.5	28.2	28.3	29.67	25.20	27.5	51.04	31.07	41.29	41.18	26.18	30.65	20.08	11.62	15.91
18	25.69	16.14	20.92	18.1	15.9	16.6	16.73	12.31	14.6	36.40	24.24	30.42	31.57	22.45	27.04	12.70	4.33	8.57
19	18.56	10.47	14.54	11.5	8.4	10.0	10.93	7.07	9.0	21.48	19.64	20.57	19.41	16.22	17.78	9.01	2.44	5.76
15–19	35.42	27.32	31.41	30.2	31.3	30.7	28.19	25.30	26.8	50.31	34.42	42.53	40.12	34.49	37.16	22.43	15.46	19.00
20	13.52	6.50	10.06	8.0	5.0	6.5	7.08	3.83	5.5	13.28	15.00	14.13	14.49	9.52	12.05	8.09	1.92	5.04
21	11.34	6.16	8.76	5.7	3.3	4.5	6.59	3.02	4.8	11.57	10.60	11.10	13.58	7.80	10.75	3.56	1.37	2.47
22	6.55	1.22	3.91	4.1	2.5	3.3	7.47	2.70	5.1	10.20	7.90	9.07	10.31	5.44	7.91			
23	5.20	0.84	3.03	3.4	1.9	2.7	8.0	1.95	4.4	8.36	5.93	7.17	10.16	5.49	7.89			
24	3.12	0.33	1.74	2.5	1.5	2.1	5.75	1.36	3.6	7.26	4.60	5.95	10.00	5.45	7.79			
20–24	7.88	2.96	5.44	4.6	2.8	3.8	6.76	2.62	4.7	10.19	8.90	9.55	11.75	6.78	9.32	4.50	1.48	3.00
5–24	56.82	52.97	54.92	58.3	58.9	58.6	47.85	45.69	46.8	61.38	57.63	59.50	61.03	57.03	59.03	60.24	57.63	59.00

1. Primary, secondary general, secondary vocational and higher full-time education.
2. 1957–58.
3. 1958–59.
4. Part-time vocational students included, total divided by 4.
5. Including estimates by the Secretariat concerning vocational education.

Source: Unpublished data in OSTP files.

M = Male.
F = Female.
T = Total.

TABLE II. O.E.E.C. MEMBER AND ASSOCIATED COUNTRIES ENROLMENT RATIOS BY AGE GROUPS

COUNTRY	YEAR	RATIO OF NUMBER OF STUDENTS TO TOTAL POPULATION OF AGE GROUPS			
		5–14	15–19	20–24[1]	5–24
Austria	1957	84.8	13.1	3.7	46.5
Belgium	1957	85.8	31.4	5.4	54.9
Denmark	1957	81.3	18.4	6.7	49.1
France	1958	90.0	30.7	3.8	58.6
Germany (F.R.)	1958	78.5	17.3	4.5	41.5
Greece	1956	74.2	16.7	2.2	42.0
Iceland	1957	72.4	61.4	6.5	56.9
Ireland	1957	80.0	15.0	4.0	43.0
Italy	1956	78.3	14.4	3.8	41.9
Luxembourg	1957	74.6	25.2	5.4	43.6
Netherlands	1958	85.5	32.7	4.7	57.4
Norway	1957	77.4	37.2	9.3	59.0
Portugal	1957	55.3	8.3	2.9	31.2
Spain	1958	74.9	13.2	3.3	39.6
Sweden	1960	91.5(7–15)	32.3(16–18)	12.2(19–24)	58.4(7–24)
Switzerland	1956	78.0	23.0	4.0	45.0
Turkey	1959	44.7	3.3	1.1	25.1
United Kingdom	1957	98.4	19.0	3.0	59.0
Yugoslavia	1956	66.3	16.9	4.1	37.8
Canada	1958	91.3	55.6	7.7	66.7
United States	1958	89.9	66.2	12.0	69.9

[1] Excluding foreign students and nationals studying abroad.
Source: Unpublished data in OSTP files.

TABLE III. O.E.E.C. MEMBER AND ASSOCIATED COUNTRIES—NUMBER OF GRADUATES OF GENERAL SECONDARY EDUCATION (BY SEX) IN RELATION TO POPULATION AGED 19[1]—1956–57

COUNTRY	POPULATION AGED 19 1956–57			GRADUATES OF GENERAL SECONDARY EDUCATION 1956–57			GRADUATES AS A PERCENTAGE OF POPULATION–AGED 19		
	M	F	T	M	F	T	M	F	T
Austria	60,500	58,520	119,020	3,163	1,775	4,938	5.23	3.03	4.15
Belgium	59,766	59,216	118,982	7,761[2]	2,381[2]	10,142[2]	12.99	4.02	8.52
Denmark	31,741	30,022	61,763	1,949	1,419	3,368	6.14	4.73	5.45
France	288,800[3]	280,300[3]	569,100[3]	26,090	22,892	48,982	9.03	8.17	8.61
Germany (F.R.)[4]	504,000	485,000	989,000	24,456	11,752	36,208	4.85	2.42	3.65
Greece	75,431	75,170	150,601	..	..	..	..	..	..
Iceland	..	..	..	..	..	..	..	..	..
Ireland	24,200[5]	22,500[5]	46,700[5]	2,766[6]	2,945[6]	5,711[6]	11.43[6]	13.09[6]	12.23
Italy	411,926	402,579	814,505	18,303	7,367	25,670	4.44	1.83	3.15
Luxembourg	1,990[5]	1,970[5]	3,960[5]	213	68	281	10.70	3.45	7.10
Netherlands	87,900	85,000	172,900	7,087	3,913	11,000	8.06	4.60	6.36
Norway	21,933	21,232	41,165	2,790	2,057	4,847	12.72	9.69	11.23
Portugal	83,237[5]	79,549[5]	162,786[5]	1,968[7]	1,016[7]	2,984[7]	2.36	1.28	1.83
Spain	..	..	..	16,097	5,171	21,268	..	..	..
Sweden	46,847	45,815	92,662	3,681[8]	2,872[8]	6,553[8]	7.86	6.27	7.07
Switzerland	35,870[5]	35,236[5]	71,106[5]	..	..	..	..	..	..
Turkey	..	..	..	..	..	..	..	..	..
United Kingdom	342,514	335,432	677,946	..	..	..	..	..	..
Yugoslavia	164,600[5]	158,800[5]	323,400[5]	9,288	6,699	15,987	5.64	4.22	4.94
Canada	123,080[5]	119,760[5]	242,840[5]	..	..	..	..	..	..
United States	1,172,000	1,136,000	2,308,000	701,000[9]	757,000	1,458,000	59.81	66.64	63.17

1. The age of 19 has been chosen as being the average age for the end of secondary education in most countries.
2. 1955–56.
3. At 1st January, 1959.
4. Excluding the Saar and West Berlin.
5. Estimates based on total age group 15–19.
6. All secondary school leaving certificates (this figure probably includes ordinary leaving certificates).
7. General secondary school certificates 3rd cycle.
8. Higher certificate examination only.
9. All high school diplomas.

Source: Unpublished data in UNESCO files based on countries' replies to questionnaire UNESCO ST/Q/37.

M = Male.
F = Female.
T = Total

TABLE IV. O.E.E.C. MEMBER AND ASSOCIATED COUNTRIES—NUMBER OF FIRST POPULATION AGED 19[1] AND IN SCIENTIFIC FIELDS IN

COUNTRY	POPULATION AGED 19			FIRST ENROLMENTS TOTAL		
	a			*b*		
	Male	Female	Total	Male	Female	Total
Austria	60,500	58,520	119,020	2,736[3]	1,118[3]	3,854[3]
Belgium	59,766	59,216	118,982	5,182[4]	1,375[4]	6,557[4]
Denmark	31,741	30,022	61,763	1,331	510	1,841
France	288,800	280,300	569,100	..	..	40,927[4]
Germany (F.R.)	504,000	485,000	989,000	..	..	36,447[3]
Greece	75,431	75,170	150,601	4,946[7]	1,415[7]	6,361[7]
Iceland	..	..	..	..	..	..
Ireland	24,200[2]	22,500[2]	46,700[2]	1,564	524	2,088
Italy	411,926	402,579	814,505	..	..	28,192[8]
Luxembourg	1,990[2]	1,970[2]	3,960[2]	..	..	..
Netherlands	87,900	85,000	172,900	4,588[9]	1,071[9]	5,659[9]
Norway	21,933	21,232	43,165	..	..	..
Portugal	83,237[2]	79,549[2]	162,786[2]	..	..	..
Spain	..	..	..	9,309[4]	2,573[4]	12,969[10]
Sweden	46,847	45,815	92,662	3,626	2,304	5,930
Switzerland	35,870[2]	35,236[2]	71,106[2]	..	..	..
Turkey	..	..	..	..	..	..
United Kingdom	342,514	335,432	677,946	21,266	7,208	28,474
Yugoslavia	164,600[2]	158,800[2]	323,400[2]	..	..	..
Canada	123,080	119,760[2]	242,840	..	..	34,200[11]
U.S.A.	1,172,000	1,136,000	2,308,000	445,324[12]	284,401[12]	808,482

[1] The age of 19 has been chosen as being the average age for beginning higher education in most countries. Scientific fields include: natural sciences, engineering and agriculture.

[2] Estimates based on the age-group 15–19.

[3] Number of students enrolled in the first semester of studies during the Winter Semester 1957–58 and Summer Semester 1958.

[4] First enrolments in universities only excluding technical high schools.

[5] Technical university only.

[6] Natural sciences only.

NOTE. Tables III and IV should be compared with great care because in some countries students may enter institutions of higher education with a diploma other than a general secondary certificate of education at the advanced level.

Source: Statistical Year Books of the countries concerned or other national data.

ENROLMENTS IN INSTITUTIONS OF HIGHER EDUCATION IN RELATION TO RELATION TO TOTAL FIRST ENROLMENT (BY SEX)—1957–58

FIRST ENROLMENTS IN SCIENCE			PERCENTAGE			PERCENTAGE		
c			*b*:*a*			*c*:*b*		
Male	Female	Total	Male	Female	Total	Male	Female	Total
1,035	139	1,174	4,52	1.91	3.24	37.83	12.43	30.46
1,982[4]	237[4]	2,219[4]	8.67	2.32	5.51	38.25	17.24	33.84
416[5]	20[5]	436[5]	4.19	1.70	2.98	31.25[5]	3.92[5]	23.68[5]
..	..	14,850[6]	..	..	7.19	..	..	36.28
..	..	..	..	..	3.69	..	..	..
1,192	184	1,376	6.56	1.88	4.22	24.10	13.00	21.63
..	..	..	..	..	..	..	..	..
..	..	..	6.46	2.33	4.47	..	..	..
..	..	6,814	..	..	3.46	..	..	24.17
..	..	..	..	..	..	..	..	..
2,047	159	2,206	5.22	1.26	3.27	44.62	14.85	38.98
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
2,337[4]	698[4]	3,935[10]	..	..	..	25.10[6]	27.13[6]	30.34[10]
1,390	222	1,612	7.74	5.03	6.40	38.33	9.64	27.18
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
..	..	..	6.21	2.15	4.20	..	..	..
..	..	..	..	..	..	..	..	..
..	..	..	..	..	14.08	..	..	..
..	..	78,757[13]	38.00	25.04[12]	35.03	..	..	9.74[13]

7. Number of students enrolled in first year of studies (excluding teachers' colleges).
8. Number of students enrolled in first year of studies less 'studenti fuori corsi' who re-enter for the first year of studies.
9. Number of students enrolled in first year of studies.
10. Universities and technical high schools.
11. Canadian estimates.
12. Excluding engineering schools.
13. Engineering schools only.

TABLE V. O.E.E.C. MEMBER AND ASSOCIATED COUNTRIES—NUMBER OF FIRST
TION OF THE MEDIAN AGE[2] AND NUMBER OF SCIENCE

COUNTRY	POPULATION			FIRST DEGREES TOTAL			FIRST DEGREES NATURAL SCIENCES		
	a			*b*					
	M	F	T	M	F	T	M	F	T
Austria	42,300[3]	41,380[3]	83,680[3]	1,258	335	1,594	93	10	103
Belgium	60,263	59,667	119,930	3,770	637	4,407	230	97	327
Denmark	..	..	..	..	..	..	..	..	..
France	319,250[4]	296,800[4]	616,050[4]	..	..	15,715	..	..	2,690
Germany (F.R.)	318,000	310,000	628,000	13,691[6]	2,958[6]	16,649[6]	1,071	64	1,135
Greece	73,939	76,428	150,367	2,950	748	3,698	252	47	299
Iceland	..	..	..	..	..	..	..	..	..
Ireland	18,400[3]	17,400[3]	35,800[3]	1,158	481	1,639	74	40	114
Italy	401,350	398,252	799,602	13,686[7]	6,250[7]	19,936[7]	1,176[7]	1,229[7]	2,405[7]
Luxembourg	..	..	..	..	..	23[8]	..	..	..
Netherlands	78,919	75,923	154,842	2,406	373	2,779	259	26	285
Norway	20,326[9]	19,165[9]	39,491[9]	682	123	805	82	17	99
Portugal	80,684[3]	81,164[3]	161,848[3]	1,708	581	2,289	70	115	185
Spain	..	..	589,400[3]	5,037	1,161	6,198	670	154	824
Sweden	42,941	41,985	84,926	1,287	611	1,898	277	73	350
Switzerland	34,443[4]	39,330[4]	73,773[4]	..	..	1,259	..	..	175
Turkey	..	..	533,200	291	107	398	4	3	7
United Kingdom[11]	318,900	313,450	632,350	13,505	4,935	18,440	3,668	1,120	4,788
Yugoslavia	177,600[3]	172,400[3]	350,000[3]	4,931	2,141	7,072	348	296	644
Canada	115,181[3]	114,069[3]	229,250[3]	..	..	17,354[12]	..	..	1,370[12]
U.S.A.	1,091,000	1,087,000	2,178,000	240,985	121,564	362,549	28,590	6,734	35,324

1. Degrees of university level only.
2. The average number of years necessary to take a first degree in each country has been added to the median age of 19, which was assumed to be the average age for beginning higher education.
3. Estimates based on the age-group 20–24.
4. At 1st January, 1959.
5. Excluding natural sciences.
6. Winter Semester 1957–58 plus Summer Semester 1958.

M = Male. F = Female. T = Total.

DEGREES[1] IN INSTITUTIONS OF HIGHER EDUCATION IN RELATION TO POPULA- FIRST DEGREES IN RELATION TO TOTAL FIRST DEGREES—1957–58

FIRST DEGREES ENGINEERING			FIRST DEGREES AGRICULTURE			FIRST DEGREES TOTAL SCIENCE			PERCENTAGE			PERCENTAGE		
						c			*b*:*a*			*c*:*b*		
M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
70	2	72	63	3	66	226	15	241	2.97	0.81	1.90	17.97	4.48	15.12
1,394	..	1,394	175	..	175	1,799	97	1,896	6.26	1.07	3.67	47.72	15.23	43.02
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3,964	182	4,146	521	9	530	4,385[5]	191[5]	7,366	..	..	2.55	..	..	27.90
3,252	29	3,281	656	28	684	4,979	121	5,100	4.31	0.95	2.65	36.37	4.09	30.63
211	3	214	113	3	116	576	53	629	3.99	0.98	2.46	19.53	7.09	17.01
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
192	..	192	81	1	82	347	41	388	6.29	2.76	4.58	29.97	8.52	23.67
2,072[7]	64[7]	2,136[7]	652[7]	9[7]	661[7]	3,900	1,302	5,202	3.41	1.57	2.49	28.50	20.83	26.09
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
452	5	457	115	11	126	826	42	868	3.05	0.49	1.79	34.33	11.26	31.23
219	1	220	17	..	17	318	18	336	3.36	0.64	2.04	46.63	14.63	41.74
261	18	279	67	9	76	398	142	540	2.12	0.72	1.41	23.30	24.44	23.59
..	..	..[10]	473	..	473	1,143	154	1,297	..	..	1.05	22.69	13.26	20.93
50	1	51	21	..	21	348	74	422	3.00	1.46	2.23	27.04	12.11	22.23
..	..	328	..	..	41	..	..	544	..	..	1.71	..	..	43.21
..	..	..	4	..	4	8	3	11	..	..	0.07	2.75	2.80	2.76
2,276	12	2,288	526	61	587	6,470	1,193	7,663	4.23	1.57	2.92	47.91	24.17	41.56
967	163	1,130	741	127	868	2,056	586	2,642	2.78	1.24	2.02	41.70	27.37	37.36
..	..	2,143[12]	..	..	442[12]	..	..	3,955[12]	..	..	7.57	..	..	22.79
36,498	121	36,619	7,390	113	7,503	72,478	6,968	79,446	22.09	11.18	16.65	30.08	5.73	21.91

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7. For 1956.
8. Medical faculty only.
9. Population aged 24 (no data for the ages of 25 or 26 more exact for the end of studies).
10. Engineering diplomas are at the post-graduate level.
11. Not including Northern Ireland.
12. Canadian estimates.

Source: Unpublished data in UNESCO files based on countries' replies to questionnaire UNESCO ST/Q/37.

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